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ABSTRACT

This document reports the oral and written testimony of 14 witnesses who discussed general health and nutrition problems among American Indians and focused on the high incidence of diabetes among North Dakota Indians. Diabetes was relatively rare among American Indians before 1940. Nearly one in three members of The Three Affiliated Tribes aged 40 or older is diabetic, according to a 1986 health report. The Three Affiliated Tribes live on the Fort Berthold Reservation in North Dakota. Much of the testimony mentioned cultural, physical, and psychological effects caused by rural resettlement of Indian tribes who were displaced by a dam construction project on the Missouri River in the 1950s. Other discussion topics included diabetes, alcoholism, diet, and general nutrition among the Indians; government and private assistance programs; and the need for new health services on the reservation. During the hearing, testimony was given by Peter Bennett, National Institutes of Health; Dr. James Brosseau, Grand Forks Clinic; Emmarine Chase, tribal elder at Fort Berthold Reservation; Raymond Cross, counsel for The Three Affiliated Tribes; Elsie I. Danks, Extended Food and Nutrition Education Program, Fort Berthold Reservation; Byron L. Dorgan (North Dakota), Mickey Leland (Texas), and Timothy J. Penny (Minnesota), members of the U.S. House of Representatives; Gretchen Chesley Lang, associate professor of cultural anthropology, University of North Dakota; Edward Lone Fight, chairman of the Council of The Three Affiliated Tribes; Sister Anna Rose Ruhland, tribal nutritionist, Fort Berthhold Reservation; Dr. Terrence Sloan, director of Aberdeen Area Indian Health Services (South Dakota); Alonzo Spang, Bureau of Indian Affairs (Fort Berthold Agency); and Dr. Herbert J. Wilson, family physician in New Town, North Dakota. This report includes charts, articles, and statistical information on diabetes and American Indian health. (TES)

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HUNGER AND NUTRITION PROBLEMS AMONG AMERICAN INDIANS: A CASE STUDY OF NORTH DAKOTA

HEARING

BEFORE THE

SELECT COMMITTEE ON HUNGER
HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

FIRST SESSION

HEARING HELD IN NEW TOWN, ND, JULY 10, 1987

Serial No. 100–11

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HUNGER AND NUTRITION PROBLEMS AMONG AMERICAN INDIANS: A CASE STUDY OF NORTH DAKOTA

FRIDAY, JULY 10, 1987

House of Representatives,
Select Committee on Hunger,
New Town, ND.

The select committee met, pursuant to notice, at 10:15 a.m., in the high school gymnasium, New Town, ND, Hon. Mickey Leland (chairman of the committee) presiding.

Members present: Representatives Dorgan and Penny.

Chairman Leland. This hearing of the House Select Committee on Hunger of the U.S. Congress will now come to order. Let me now yield to my colleague from North Dakota, Mr. Dorgan.

OPENING STATEMENT OF HON. BYRON L. DORGAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NORTH DAKOTA

Mr. Dorgan. Mr. Chairman, thank you very much and let me, as a very brief introduction at this hearing, introduce to those of you who have come to the hearing today the Members of Congress who are present.

Congressman Mickey Leland is the chairman of the Select Committee on Hunger and represents Houston, TX.

Congressman Tim Penny is a member of the Select Committee on Hunger, and he is from the State of Minnesota.

We had two others who were going to be traveling with us today but we were in session late yesterday and some problems came up for them, so there are three of us rather than five of us.

We are delighted to be here and I want to welcome my two colleagues to North Dakota and to New Town and to the Fort Berthold Indian Reservation. I would like to just describe in 1 minute why we are here.

I have asked the Select Committee on Hunger to look into an area that deals with nutrition and diet that affects American Indians across this country and that especially has been brought to my attention in North Dakota in the years since I have been in Congress. That issue is diabetes.

I have been made aware in the past years of the incredibly high rate of diabetes on Indian reservations, and especially on this reservation. I have visited with members of the Select Committee on Hunger and talked to them about this problem and suggested we inquire into this problem. And we will hear testimony from experts today and from residents of the area about the problem. You will hear from experts about the link between diet and diabetes among Indians. So that is the relationship of the Select Committee on Hunger to this problem.

We are involved in a whole range of issues in the U.S. Congress to try and provide focus to hunger, nutrition, and diet problems. I am delighted that at my invitation the Select Committee on Hunger has decided to come here today and hold this official hearing.

So Chairman Leland, thank you, and Congressman Penny, thank you very much for being here.

OPENING STATEMENT OF HON. MICKEY LELAND, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Chairman **Leland**. Thank you very much, Congressman Dorgan. Let me commend you for the excellent leadership that you have provided, particularly concerning the problems of the Indians here in North Dakota. I also welcome the opportunity to participate in a hearing here in North Dakota. This is my first visit to this State and I look forward to coming back when we have got more time to visit with folks here and others around the State.

I also want to express my sincere appreciation to the Tribal Council of the Three Affiliated Tribes, particularly the chairman, Mr. Lone Fight; to the tribal members who will perform the introductory ceremonies, I say thank you to them also.

Today we will hear testimony from distinguished witnesses concerning hunger and nutrition problems among American Indians. While the hearing today focuses on solutions needed to address the concerns of the Three Affiliated Tribes, we will also address the related concerns of Native Americans nationwide.

I arrived on your reservation aware of the grim social, economic, and health conditions of your people. I have read of the astronomically high unemployment rates on the reservation, which reach levels as high as 80 percent during the winter months. According to the North Dakota Indian Affairs Commission, the 1982 per capita income here is $4,069—less than one-half that of the total U.S. population. Additionally, the cost of basic necessities such as food and utilities is very high, due to the cold, harsh winters, and limited physical access to retail food outlets.

I have learned of the devastating impact that the building of the Garrison Dam has had on your most fertile lands and on the infrastructure of your communities. As a matter of fact, your Congressman was showing us graphically, as we were flying here, what the impact has been.

I have seen the recommendations of the Garrison Unit Joint Tribal Advisory Committee which seek to compensate the tribes for the negative impact of the dam on your economic, physical, and emotional well-being. The committee will examine the recommendations of this report along with other testimony presented here today.

While health trends for American Indians have improved over the past decade, at many reservations the rate of serious health conditions has remained stagnant and has, in some cases, even worsened. The health status of the people of the Three Affiliated Tribes is abysmal when compared with all American Indians and the total U.S. population.

Diabetes, a malnutrition-related health problem, is the focus of our committee's investigation today. This disease, which was rare among American Indians before the 1840's, has now reached epidemic proportions at Fort Berthold.

In a 1986 report on the health care needs of the Three Affiliated Tribes, the University of North Dakota School of Medicine reported that nearly one in three persons aged 40 or older is diabetic. That is abysmal. It is a problem that we must address and address now.

I am so happy that your Congressman would invite us here. My statement is a lot longer than what I have given you. Let me just say, in short, that the committee will by unanimous consent accept the statements both of myself and those in full of my colleagues so that we can make reference to those statements further in the future when we consider how to resolve these very desperate problems confronting the people here today. So now, let my turn to my colleague from Minnesota, Mr. Penny, who is here with us today.

[The prepared statement of Mr. Leland appears at the conclusion of the hearing, see p. 37.]

OPENING STATEMENT OF HON. TIMOTHY J. PENNY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MINNESOTA

Mr. **Penny**. Mr. Chairman, I appreciate the invitation of Congressman Dorgan to come to North Dakota and to focus particularly on the diabetes problem among the American Indian population and hunger problems generally.

All of us on this committee, from whatever part of the Nation that we call home, have a special concern about hunger and nutrition and other health problems here and around the globe. In particular, Byron and I, coming from the Farm Belt, are perplexed by the fact that domestically we have a grain surplus and yet in so many regions of our own country and certainly in many nations around the globe we have severe hunger problems and malnutrition. It is for that reason that we requested membership on the Hunger Committee so that we could be part of an effort within Congress to draw attention to these very urgent issues. We are here today to learn from you and hope to carry back your message to our colleagues in Congress to help them to focus with us on these important and urgent issues. Thank you, Mr. Chairman.

Chairman **Leland**. The gentleman from North Dakota.

Mr. **Dorgan**. Mr. Chairman, let me just add one additional word. We met this morning, beginning at 7:30 in Minot, on a broader range of hunger issues. I want to point that out to tell you that while we are in North Dakota we also met with some farmers this morning and with some people who are involved in the WIC Program, the Head Start Program, food banks, the Temporary Emergency Food Assistance Program [TEFAP] and others.

The reason for that is obvious. Our interest and our focus is on hunger. The reason I have wanted to be on this Select Hunger Committee and got on it some while ago was because we come from a land where our grain bins bulge with grain that we cannot find a use for, or at least cannot find a method of marketing in this country, and yet in this country and around the world there still does exist significant amounts of hunger. There also are significant diet and nutrition problems.

It seems inconceivable to me that we cannot solve these problems if we put our mind to it. If we decide they are a priority, then we can solve them. It is in agriculture's interests, it is in humanity's interests, for us to focus on these issues. Where better to focus them than in North Dakota, the breadbasket of the world that produces food in such incredible abundance?

So, Mr. Chairman, I am delighted you are here, again, and I would hope that we can move ahead with the hearing. Thank you.

Chairman LELAND. Thank you. Let me just admonish all of our witnesses that we have a long agenda, but very little time to fulfill it. And if you can be as brief as possible, we certainly would appreciate it so we can move along quickly. We are going to try to accomplish as much as we can while we are here today.

I would like now to introduce, and express my sincere appreciation to, Mr. Edward Lone Fight, the chairman of the Council of the Three Affiliated Tribes. I know he and his staff have worked diligently to assist us in our preparation for today's proceedings. I thank you, Mr. Chairman, for the kind of help that you have given us. And let me just say that we hope that through this hearing we can do a lot to further the cause of helping the people here whom you represent. Mr. Lone Fight.

Mr. LONE FIGHT. Thank you. [Repeated in Hidatsa.]

It is my pleasure, I am very happy to welcome all the Congressmen. Welcome to Fort Berthold Indian Reservation. We are very happy and pleased that you have taken the time away from your busy schedule to address some of the health needs and economic needs and just the general overall needs of the tribal members of the Three Affiliated Tribes.

First of all, I would like, before I get into the schedule, just for the audience to explain that 10 to 12 o'clock is reserved for the hearing and testimonies. At 12:20 p.m. or so, we will drive the Congressmen, and you are cordially invited to go to the Tribal Administration Building. There we will have a luncheon and reception, and we will also have a couple of Indian songs and maybe several dances, at the Tribal Administration Building.

Shortly after that we will visit the WIC clinic and this will be guided by Sister Anna Rose Ruhland. Then we will be driving to the Food Distribution Program, our commodity distribution center, and we will tour the warehouse. And then that will conclude the official day. You will be driven back to the airport for your departure from Fort Berthold.

At this time I would like to call on the Oakdale Singers. The Oakdale Singers are from the village of, segment of Mandaree, ND. And they will be accompanied by Miss Fort Berthold, which will be Barbara Smith, who will stand by the drum. I ask her to come up at this time. Barbara.

And we will have a flag song to get the ceremonies, the hearings started. And after the flag song we will have a victory song to welcome the Congressmen. Please rise for the flag song. The flag is to my left, your right.

[Whereupon, the two songs were sung.]

Mr. LONE FIGHT. Thank you very much, Oakdale. We will now have a prayer by Wesley Plenty Chief to start the activities.

Mr. PLENTY CHIEF. [Prayer in the Indian tongue.]

Mr. LONE FIGHT. Chairman Leland, I turn it back over to you.

Chairman LELAND. Mr. Lone Fight, we now recognize you to make any statement that you may have.

Mr. LONE FIGHT. All right. Thank you very much, Mr. Chairman. Before I commence with my prepared speech I want to announce that I have with me as an expert witness our tribal attorney, Raymond Cross, to my left; and Herbert Wilson, a local physician who came on board about the time the Garrison Dam was created.

STATEMENT OF EDWARD LONE FIGHT, CHAIRMAN, COUNCIL OF THE THREE AFFILIATED TRIBES, FORT BERTHOLD RESERVATION, NEW TOWN, ND, ACCOMPANIED BY HERBERT WILSON, M.D., FAMILY PHYSICIAN, AND RAYMOND CROSS, ESQ., COUNCIL

Mr. LONE FIGHT. My testimony, Mr. Chairman and members of the committee: My name is, of course, Edward Lone Fight. It is my pleasure to testify before your committee in my capacity as chairman of the Three Affiliated Tribes. Let me first express my thanks on behalf of the full tribal council to your committee for the concern and interest you have shown by convening this hearing regarding the nutritional and health care needs of the three tribes on the Fort Berthold Reservation.

The relevant statistics paint a stark and shocking picture of the present health care and nutritional status of the tribal people. The pertinent health care data, compiled and evaluated by the School of Medicine of the University of North Dakota in 1986, shows that the tribal people on Fort Berthold are subjected to a significantly inferior level of health and nutritional care.

That recent study examined the statistical incidence of diabetes-related deaths, infant mortality, morbidity and alcoholism-related deaths among the tribal people on the Fort Berthold Reservation.

For example, the infant mortality rate on Fort Berthold is 32.8 per 1,000 births compared with a 10.8 national average rate, and a 13.3 rate for the entire Indian service population. The diabetes mortality rate at Fort Berthold is 123.6 per 100,000 population, compared with a national average of 9.6, with a 10.9 rate for all American Indians. The alcoholism mortality rate at Fort Berthold is 200.6 per 100,000 compared with a 6.4 national average rate. The Pierre service unit has the next highest rate at 115.7 in the Aberdeen IHS service area.

That report concludes that these statistics are all the more tragic when it is recognized that with only a modest increase in expenditures by the Indian Health Service for improved health care delivery and nutritional education, that many of these deaths could be avoided on Fort Berthold.

There are, Mr. Chairman, prudent and reasonable public health responses to the shocking Indian health care and nutritional statistics on Fort Berthold. The Three Affiliated Tribes urge this committee to support in this regard the recommendations of the Joint

Tribal Advisory Committee known as JTAC. That Federal commission recommended that the Indian Health Services construct, operate, and maintain a primary health care facility on Fort Berthold that would emphasize the prevention and treatment of obstetrics, dialysis, alcoholism, and diabetes-related problems among the Indian people on Fort Berthold.

The total cost estimate for these modest facilities is estimated at $3 million to build and $1.5 million to equip. This facility would also employ approximately 30 tribal members in various full time positions.

It should be added that this Federal commission found that the Three Affiliated Tribes, aside from the compelling statistical case presented, are entitled to this health care facility because the Federal Government had promised to build a replacement hospital facility under Public Law 81-437, when the previous reservation hospital was destroyed in the 1950's as a result of Federal action in the construction of the Garrison Dam and Reservoir.

Several health care experts, including professionals from the Indian Health Service, will testify regarding the health and nutritional needs of the tribal people on Fort Berthold. It is my belief that such can be done through administrative and legislative action to prevent these recurring tragedies on the reservation.

This concludes my testimony, Mr. Chairman, and I would be happy to answer any questions that the committee may have. Thank you.

[The prepared statement of Mr. Lone Fight appears at the conclusion of the hearing, see p. 39.]

Chairman LELAND. Thank you very much, Mr. Lone Fight, for your brief but very poignant testimony. We really appreciate it.

Have you arrived at any conclusions as to why the proportionality of the problems that you have on this reservation are comparatively higher than they are on other reservations throughout the country, particularly with alcoholism and the problem of infant mortality, morbidity, and so forth?

Mr. LONE FIGHT. I will defer that to my attorney.

STATEMENT OF RAYMOND CROSS, COUNSEL, THE THREE AFFILIATED TRIBES, FORT BERTHOLD RESERVATION, NEW TOWN, ND

Mr. CROSS. Thank you, Mr. Chairman. You have had the opportunity to study those issues through a study that will be provided to the committee by the Northwestern Center for Urban Policy Research.

As you know, Mr. Chairman, you had the opportunity to see the large reservoir that was created. As a result of that reservoir 90 percent of the tribal population was displaced in the 1950's and relocated from their closely knit communities along the Missouri River to the plains that you now see where they reside.

That study shows a direct relationship between that removal, that dispersion, and the stress-related illnesses such as diabetes, infant care and morbidity, and mortality problems. We would be happy to furnish that report that does trace a picture: the pre-Garrison and post-Garrison.

So that, Mr. Chairman, while we cannot say with scientific directness that that is the sole cause, it is certainly a contributing factor that can be corroborated by our expert witness, Dr. Wilson, because he has had the opportunity as a family practitioner of some 30-odd years to see how the rates have accelerated in diabetes, in infant morbidity, infant mortality, in alcoholism. And I would like now to call on Dr. Wilson to present his summary.

Dr. WILSON. I have a handout here. I have 60 pieces of it, so we can distribute these.

STATEMENT OF HERBERT J. WILSON, M.D., FAMILY PHYSICIAN, NEW TOWN, ND

Dr. WILSON. My remarks will be confined, my statistics, that is, are confined to the deaths that have occurred in the 35 years that I have been practicing here; not the total deaths, but the deaths of those that I have known about, that come to my clinic.

As remarked, the pattern has not changed over the years. It has maybe gotten a little worse, or maybe it is just about static.

If we will turn to this side of the chart, not where the graph is but where the tables are, we see table 1, which contrasts the average age of death of Indian adults; that is, people over 14 years of age. We did not add the children in because that would skew the figures way down for the Indian population. We thought once an Indian reached 14 or so he probably should have as good a chance of surviving as anyone else.

Note that for Indian males where the average age of death when I came here in—1955, to 1964—was 52. Down to 47, 1965–74; then up to 49, 1975–84. Females did a little better; 51, 59, and 57 for same time periods.

Then, right down below is a comparison with the other side of my practice—which is half-and-half, practically, half Indian people and half other people that live in this area. And you see how that has improved so much over the years.

Table 2 will discuss violent deaths, and I am going to have something to say about that later. As you see, there are many more violent deaths, which are deaths due to social unrest, among the Indian people than among the non-Indian people.

Table 3 talks about alcoholism and table 4 also, trying to find out about it in a hospital that is 31 miles away—we have a small local hospital in Stanley—and the admissions in a 2-year period; how they compare.

And then, the final table is, again, on admissions to that hospital.

All right. Let us turn to the other side and we will find on the left, the first bar diagram is the non-Indian population in my area. It is 100 percent from the bottom to the top. There are 847 deaths in that group and in the Indian group there were 624; roughly equal. The percentage-wise thing is out here. Now, I have crosshatched diabetes, deaths due to diabetes. My study here shows that there were four times as many deaths due to diabetes in the people who are classified as Fort Berthold beneficiaries as in the general population.

Then I have highlighted the deaths that were due, by my determination, to what I call social unrest. And we can see that social unrest caused 12.5 deaths among the general population and 40.5 percent in the Fort Berthold population.

So for what they are worth, I certainly bear out the more scientific studies. This is fairly accurate. At this point I will stop and see if you have any questions.

[Exhibits submitted by Dr. Wilson appear at the conclusion of the hearing, see p. 42.]

Chairman **Leland**. Thank you. Let me now turn to the gentleman from Minnesota.

Mr. **Penny**. I am curious to know the total population non-Indian and the total population Indian.

Dr. **Wilson**. That is a hard question to answer, sir, because I draw my patients from a large area. I am the only private physician in the area and it probably would include about 2,500 non-Indians and 2,000 Indians.

Mr. **Penny**. So that the numbers of potential patients in your service area are roughly comparable between the Indian and the non-Indian population?

Dr. **Wilson**. Exactly.

Mr. **Penny**. With a little more for the non-Indian?

Dr. **Wilson**. It is a wonderful laboratory for comparing.

Mr. **Penny**. And the major differences appear as you highlighted, with the diabetes, where the incidence of the disease is much higher for the Indian population, automobile accidents much higher, social unrest much higher, and alcohol much higher.

But I see in checking the column, that among the non-Indian population vascular and heart disease are much more evident than they are among the Indian population. Is there some explanation for that? I can think of one possible explanation and that is that the diseases that seem to be taking Indian lives, diabetes, automobile, alcohol, may be taking their lives at a much earlier stage.

Dr. **Wilson**. I think, yes.

Mr. **Penny**. And the non-Indian population perhaps developing these vascular and heart problems at a much older age.

Dr. **Wilson**. I think that is exactly it. I think, though, if you look in 10-year periods—I do not have those charts here—you will see the Indian people are catching up with vascular and heart disease because those are, of course, an early end result of diabetes.

Mr. **Penny**. Thank you, Mr. Chairman.

Chairman **Leland**. Mr. Dorgan.

Mr. **Dorgan**. The statistics that you have presented are staggering statistics. I note that the infant mortality rate that you cite is over 10 times the infant mortality rate nationally. The diabetes mortality rate is over 12 times the national diabetes mortality rate. The alcoholism mortality rate is over 25 times greater. When you think of just doubling something, doubling something is a significant increase. We are talking of a 10-fold greater rate, a 12-fold greater rate, and 25-fold greater rate.

Those are staggering statistics and I guess I would like to, with respect to diabetes especially, I would like to address a question to Dr. Bennett. We are going to have testimony in the next panel that describes the history of the Indian population here, having lived on the Missouri River bottom land, very fertile bottom land, planting gardens with an abundance of vegetables and fruit in their diets. Then they were moved off of that bottom land by virtue of the inundation behind the dam to soil that does not support gardening, that does not support the production of fruit. Therefore, the diet has changed dramatically and that has caused a direct link to the increase and incidence of diabetes.

Can you give me your impression of that testimony that we are going to hear?

Dr. **Wilson**. That is exactly right, Congressman. I watched with great sadness, through the relocation, how many of the older people tried to have gardens when they came out in the toplands, and after 3 or 4 years of failing you give up. And I doubt if there are very few around here now who do have vegetable gardens. But back in the bottom lands everyone had one.

Mr. **Dorgan**. And the tribes here, as I understand the history—I am talking about history over hundreds of years—have been traditionally agricultural tribes. As I believe, when Lewis and Clark moved through this general area they discovered agricultural——

Dr. **Wilson**. Yes, that is an accurate statement.

Mr. **Dorgan** [continuing]. Tribes raising vegetables and fruits on river bottom land. Is that correct?

Dr. **Wilson**. Congressman, that is accurate, that is correct. The Mandan, Hidatsa, and Arikara tribe have always been an agricultural tribe. They lived in earth lodges and the produce developed from their hard labors were used as commodities to trade with among the rest of the Indian tribes within the area like the Sioux and the Northern Cheyenne and all the way across to the West Coast.

Mr. **Dorgan**. Is there any knowledge of or history of diabetes prior to the 1940's in this area?

Dr. **Wilson**. As far as I can find from looking at old records I can find no mention whatever of diabetes being a cause of anything before World War II. Now, the records were not as accurate in those days, of course, and maybe they were not looking as hard, but this is a very significant thing.

Mr. **Dorgan**. I was asking, maybe I should make it clear. We have always had incidence of diabetes in America. The question was, did we see prior to the 1940's any unusual cases of diabetes? And I think the chairman indicated that surveys prior to the 1940's found it almost nonexistent among Indian tribes. Thank you.

Mr. **Lone Fight**. Mr. Chairman, can I just make a statement?

Chairman **Leland**. Sure.

Mr. **Lone Fight**. Some of our members do not quite understand English so I just want to say something in Hidatsa so that they can understand what this is all about.

[Mr. Lone Fight then made remarks in Hidatsa.]

Chairman **Leland**. Mr. Chairman, let me ask you, in your testimony you mentioned the need for a primary health care facility to be located on the reservation. What difficulties do tribal members currently experience in accessing health care services?

Mr. **Lone Fight**. Dr. Wilson.

Dr. **Wilson**. As I mentioned, the nearest hospital to New Town is 31 miles. The road is usually open year round but there are some times when visibility is bad. So New Town is not as bad as the interior of the reservation.

There is a matter, of course, speaking of weather, in getting your cars to go and things like that.

I think, more than anything else, though, it is a matter of acceptance. I am not saying that the peripheral hospitals do not accept Indian people. What I am saying is, that people feeling they can go there and just talk about something that would be important to them, but according to regulations such small talk would be denied as a necessary thing. In other words, preventive medicine is a no no in contract care situations.

I am sure you are all aware of what is happening in our country affecting the way physicians practice medicine. They are not allowed to practice old-fashioned family medicine. Old-fashioned is as good today as it ever was. They are not allowed to practice preventive medicine and have reimbursement by insurance companies, Medicare, Public Health Service, or whatever.

So you see, we need a facility where they can accept people and not worry about their eligibility. That is the main problem, as I see it.

Chairman LELAND. Very good. Because of time constraints we are going to have to move on. But let me suggest that we have other questions, possibly of all three of you, will be submitted to you in writing. We would like to leave the record open for your responses.

Mr. LONE FIGHT. OK. Thank you very much.

Chairman LELAND. Thank you so much, all three of you. We greatly appreciate your testimony.

I would like now to welcome Mrs. Emmarine Chase. I know you have made a great personal effort to come to the proceedings today. Mrs. Chase brings to us her personal experience with diabetes and with the serious health complications of diabetes suffered by her husband and family.

We also have with her Sister Anna Rose Ruhland—and I hope I am pronouncing your name right. The Sister is a Benedictine nun with a master's degree in nutrition. She is the only nutritionist on the reservation. With funding from the Supplemental Feeding Program for Women, Infants and Children (WIC) and the State Maternal and Child Health Care Block Grant, she is working diligently to address the nutrition-related health problems on the reservation. She provides the committee with expert testimony on the diet and nutrition education needs of the reservation along with insights as to the effectiveness of the Food Distribution Program in addressing the special needs of diabetics on the reservation.

We have one more person, Ms. Elsie Danks. Ms. Danks is a longtime resident of the Fort Berthold Reservation. She lives and works as a nutrition educator in Mandaree which is about 45 miles south of here in a more rural, isolated community. She can tell us personal stories of those she works with who must struggle each day to feed their families and make ends meet.

We thank all three of you for the testimony that you will give. We certainly appreciate your sacrifices in being here with us today. Mrs. Chase.

STATEMENT OF EMMARINE CHASE, TRIBAL ELDER, FORT BERTHOLD INDIAN RESERVATION

Mrs. CHASE. My name is Emmarine Chase. My husband is Bernard Chase, Sr. We raised a family of six, five boys and one girl.

When we became involved in this relocation my family was involved in it from beginning to end. From an organized community where we had the comfort and support of our families in our area, we were moved up to the upper plains to five different segments and our community life was broken up. Our neighbors were strangers.

We are Indians, but we never lived close to each other. We lived in different communities and all of a sudden we were forced to move together in different communities and we did not have that community feeling that we had left.

The one thing that I want to stress on. I know we left a lot of comforts and things from the taken area, but the one thing that I want to stress is the water problem. When we lived on the bottom lands the Missouri River was flowing by, and that was our drinking water, for cooking, for livestock, bathing, recreation. That is where all my children learned to swim, and that was just our life. And then all of a sudden we are moved up to the upper plains, and there was a water problem.

They dug wells, the Army engineers or whoever was in charge, dug wells. And they were so deep we could not pump by hand, we had to have electric pumps.

And I tell you, we used to have a lot of chickens and this water is not suitable for human or even livestock. Because we used to have a lot of chickens, and when we moved up there, when we tried to eat the eggs, we cracked the eggs open. Them eggs, the yolks of those eggs were blood red. Nobody wanted to eat it. That was one of the things.

When we first moved up there we had to travel 30, 40 miles to get a cream can of water. We couldn't use that water. It was just like a laxative, that water that we brought up. Even the livestock got sick from it. Today it is still there. We never touch it. We haul our water, went to neighbors, where they had spring water. We would bring that in, in cream cans. That was an everyday chore.

And maybe that is where some of the health reasons came, because maybe our containers for water were not exactly the way they were supposed to be. But that is the way we lived, and we moved up to the upper plains in 1956 and 1957, and that is the way we lived. Just now, a few years ago, we got this self-housing that they—even then, our water is not right. We have a lot of alkali in there.

And just to tell you about those eggs will make you understand that there was something terribly wrong. And when we lived in the river bottom, we had gardens. We had irrigation gardens. And my husband and I, we were known to have big gardens because we had a large family and we had everything, I think. And then they had a cattle program, and everybody had a few head of cattle, chickens. And they were free to roam. We did not have to pay so much in living expenses on the river bottom, not compared to what we are today. Every little thing we have to buy, buy, buy. And there is a lot of us that do not have money.

There is no work, no employment on this reservation. That is why there is a lot of alcoholism. Young men stand on the streets and it is always the same group. Not every Indian is alcoholic. There are some of us that try. We were just lucky enough that my husband had a Government job, and that is the way we raised our family.

We do not have everything plush, but I had a little better living than some that live on welfare. When we were on the river bottoms we had our own way of life. It seemed like there was more sharing, more sharing when we lived on the river bottom. We had our own gardens. We did not want for no potatoes. And this tribe here, the Three Affiliated Tribes, is a corn-eating tribe. We are gardeners. We taught the white man how to garden. We taught them how to use a lot of garden produce that the white man uses today, even down to sunflower seeds.

We call them Russian peanuts. When you go in a store there's big sacks of Russian peanuts. That come from the Three Affiliated Tribes. Thank you.

Mr. DORGAN. Very good, Mrs. Chase. That was very interesting testimony. And I would like—I want to mention Russian peanuts for just a minute. But I want to set in framework for the other two members of this committee exactly what you are talking about with respect to relocation.

They decided to build some stem dams on the Missouri River. One of them was projected for North Dakota. They built the dam in North Dakota in the 1950's and the result was a 500,000-acre flood behind that dam. Part of that flooded a community—Elbow Woods, for example—and other areas of this Indian reservation, which required the relocation of the Native Americans from the river bottom lands and those communities to the upper plains. And that is what the relocation is describing.

I think you have described very well your experiences of what that relocation meant to your family. But I just wanted to make sure everybody understood exactly what the relocation was that you were describing.

Mrs. CHASE. Oh, Yes. When we were in the process of this relocation, there was no guidance from our BIA, there was no guidance how to budget, how to make a living in a different locality. There was nothing. Today when there is a little program comes up among the tribe, or the BIA—the BIA is the Bureau of Indian Affairs—when they have some little program come up, before they start working they go on a workshop. They explain about what their job description is, and they have a workshop.

When we were going to move we never had no such a thing as a workshop. They put our moneys into the individual Indian money account in BIA office and we could draw as much as we wanted to, and there was no question asked. They would give us, money, handed us money. And what did we know about spending money? We squandered that money. We squandered it in a few months and we were right back on welfare. That is why you have a high welfare list. Although I was lucky. I never was on welfare.

Mr. **Dorgan**. Mr. Chairman, I did also want to say that is the first reference I have heard to Russian peanuts. [Laughter.] Since I was a young fellow in Regent, ND, and my neighbor used to roast them in the oven.

Mrs. **Chase**. Yes. All these garden produce, that come from the Indians. Everybody reads in history books how we helped the white man, the first immigrants that came. We helped them. We were friendly people, especially the Three Affiliated Tribes were friendly to the white man. But what should happen? Smallpox epidemic come along and diminished the population. You read in history books, over and over, but they do not tell exactly how it came. A steamboat came and they bust up bundles of blankets that were contaminated from this disease, and they threw it out on the bank. And the Indians, what did they know about no disease? They took those blankets and they contracted that smallpox. That is the thing I always want to say.

And another thing I want to say, I want every white man here to hear, when they were taken in, the flood waters were covering the land, I had an allotment of 320 acres down on the bottom land. And that was taken. It got in the water. They call it the taking area. I do not know how to explain that very well. But this 320 acres did not go under water, exactly. Why did the engineers have to take so much more than they needed? This 320 acres, where it lay, were in the area where it is. All the rest that were adjacent to my land, a few years later, an oil lease came through, a big oil lease came through, and all the ones in that area received thousands of dollars. My land went under water for a measly $5,000 or something like that. That is what hurt me today. Maybe today I would be well off if the oil company paid me for what they—maybe I will not have to fall back on——

Chairman **Leland**. We understand, Mrs. Chase.

Mrs. **Chase**. And then another thing. That major requirement on this reservation, I believe is a hospital. We had a hospital, however small it was. Dr. Wilson was our last doctor, resident doctor I guess you would say. And he was more than a doctor. He was a friend to the Indian people. He had comforting words, if not making you well. He had comforting words for anybody that came. That is one man, when I read about that Tom Dooley, I always think of Dr. Wilson, because he never had no prejudice.

Chairman **Leland**. Thank you, Mrs. Chase. Let us now go to Sister Ruhland. Sister.

STATEMENT OF SISTER ANNA ROSE RUHLAND, BENEDICTINE NUN, TRIBAL NUTRITIONIST, FORT BERTHOLD RESERVATION

Sr. **Anna**. I am Sister Anna Rose Ruhland, tribal nutritionist. I am also a registered dietitian with the American Dietetic Association, and licensed to practice in the State of North Dakota.

The overall goal of Nutrition Services of the Three Affiliated Tribes is to increase the level of nutrition awareness of residents of the Fort Berthold Reservation.

The people of the Three Affiliated Tribes suffer a multitude of health problems ranging from a high rate of accidents, heart disease and diabetes, to a rapidly rising rate of cancer. Diabetes as a secondary cause claims a significant number of lives of tribal members. The disease is compounded by a tendency toward obesity, yet many Fort Berthold residents are obese and practice poor nutritional habits.

In 1984 there was a Fort Berthold household survey which was conducted by Nutrition Services. We surveyed 70 percent of the households on the reservation. In this survey it indicated that over 50 percent of the households had someone with diabetes and/or high blood pressure, and at least 70 percent of the households felt someone in the home could develop diabetes in the near future.

Individual diet instructions, which I conduct, indicate that patients are often unaware of what causes diabetes and how diabetes might be prevented or delayed. The same can be said for hypertension and heart-related nutrition problems.

Initial contact with WIC clients indicates that mother or the caretaker are often unaware of the the relationship of infant and child health and poor nutritional care. Poor nutrition may lead to future health problems of obesity, diabetes, and hypertension. Presently nutrition counseling services are provided clients through the tribal nutritionist, Nutrition Services of the Three Affiliated Tribes. The need for an adequate coordinated system of managed nutrition fitness care is important if Fort Berthold residents are to be reached and served. Limited staff and time prevents Nutrition Services from adequately meeting the needs of the residents.

The Fort Berthold Reservation has unique problems of long travel distances to community centers, health care, towns and schools, some people traveling 75- to 100-plus miles for health care and basic food needs. This was taken from our household survey of 1984. This travel is compounded with long, minus-zero temperature winters, limited gas funds or no mode of transportation, and poor road conditions. Therefore, I believe it is important to develop a consistent and uniform strategy of Nutrition Services for all segments of the reservation. In order to prevent or delay diseases such as diabetes, hypertension and heart disease, health promotion and disease prevention need to be addressed with a strong nutrition/fitness component being a part of the program.

When nutrition/fitness education is provided in an easily understood method and addressed to the specific household, and taking into consideration cultural and traditional food habits, nutritional changes are made. In the WIC—the Women, Infant and Children Supplemental Food Program—our yearly survey for fiscal year 1986 indicated that 89 percent of those surveyed made changes in their eating habits because of what was learned at WIC clinic days. Visits with the nutritionist regarding nutritional needs rated at the top way in learning. The fiscal year 1987 WIC survey showed that 93 percent of the clients rated talks with the nutritionist as an important service.

An indication of clients desire to learn about nutrition and fitness: the fiscal year 1987 had 47 percent of the respondents desiring to learn more about exercise, and 55 percent desiring to learn more about weight control. Forty-two percent also requested information regarding less fat, salt, and sugar, and increased fiber foods. I believe this is a high indication of the desire to learn and to change food habits. Nutrition/fitness education needs to be expanded to all food programs and people. In order to make intelligent food choices people need to be informed.

Therefore I recommend, first, that the nutrition-related programs—Commodity, Food Stamps, Aging Services, Head Start, WIC and School Food Service—should have written into the legislation of these programs funding authorized for nutrition/fitness personnel and programs. Nutrition staff, a dietitian or nutritionist, home economist from the Extension Service, and supporting nutrition aide staff such as EFNEP workers need to be expanded so that the nutrition education may be provided.

Nutrition food programs need to be available to all people in all areas of the communities of the reservation. Programs need to be networked for improved coordination. New and innovative nutrition programs need to be developed. This can only be accomplished when legislative funding is provided to meet staff needs,

Second, I recommend that diabetes prevention needs to be addressed with a coordinated team effort of physician, nurse, dietitian, and supporting staff. Presently there are seven diabetic projects in the Indian Health Service in the United States. These projects need to be expanded to include all peoples, and specifically the people of the Fort Berthold Reservation.

To prevent long-range complications education needs to be addressed to the presently diagnosed diabetic, the family, the extended family, and the school age child.

It is important to educate the people to better use of food so that nutrition-related diseases may be prevented. The 1984 household survey indicated that frying was a popular way of preparing foods and that there was a high frequency of foods such as cakes, doughnuts, and cookies, whereas the use of fruits and vegetables and whole grains rated low.

Third, therefore, I recommend that the Commodity Food Program decrease the level of fats and sugar in the food package and obtain a greater variety of foods, specifically fruits and vegetables, and promote nutrition education as a part of the program to all people receiving these foods.

I believe there is a need for existing programs of Food Stamps, Commodities, WIC, Aging Service, Head Start, and School Lunch Programs. The fiscal year 1987 survey from WIC indicated that 65 percent of clients also participate in other programs such as commodities or food stamps. Since a high number of households receive some form of food assistance this remains a primary way of reaching the people in regard to proper nutrition and fitness activities. For many, mainly our elderly and children, this may be the only means of food they have. Therefore to prevent regression in health, the food programs are important to the people.

An expanded nutrition staff would be able to provide creative and meaningful nutrition/fitness programs which would also consider cultural and traditional food habits. This would ultimately cause food habits to change, better selection and use of foods would develop, nutrition-related diseases would be prevented or delayed, and health would be promoted. Thank you.

[The prepared statement of Sister Anna Ruhland appears at the conclusion of the hearing, see p. 44.]

Chairman **Leland**. Thank you very much.

Ms. Danks, I was reading in the Indian newspaper this morning about a rancher named Danks, and I was just wondering if you might be any kin to him?

Ms. **Danks**. It could possibly be my brother-in-law.

Chairman **Leland**. He suggested that in order to get Washington's attention maybe he would sell some land to the Soviets so that they could build some silos. I think Washington did get excited about that.

Ms. **Danks**. I guess I would not sell any right now.

STATEMENT OF ELSIE I. DANKS, PROGRAM ASSISTANT, EXTENDED FOOD AND NUTRITION EDUCATION PROGRAM [EFNEP], FORT BERTHOLD RESERVATION

Ms. **Danks**. My name is Elsie Danks and I am a resident of the Mandaree community at Fort Berthold. My husband, Jim and I, have five grown sons. I work for the Extension Service and Keith Soiseth and Anita Rhode are my immediate supervisors.

I will skip through my prepared testimony because a lot of it is repetitive of what others have said, so I will just go through some of it.

Just the very beginning: My husband and I were married in 1947 and lived in Elbowoods until 1954 when the reservoir waters came. I remember when the water came up the last bank and filled the lower places in the town.

On the Missouri River in Elbowoods where we lived, there were like three levels of the Missouri River. They would come up one stage, and then you would go on a flat and then there was another stage. And when the last water came up, why, it came up to stay. It did not go back down. We had floods a lot of times when it always went away.

Anyway, even though we saw them tearing down the buildings and moving things out I really do not think that any of us had any notion of the extent of the change of our lives. And then we were moved to the Mandaree community. Jim's brother now lives in the Twin Butte area, one up here, and his sister lives in the White Shield area so we are all spread out, and this is like, I would say, 250 miles round trip.

But in those days most of the food was in walking distance of the homes and I do not think that people really realize the effect of the distance that we travel. For myself, from where we live, it is 45 miles to any town of significance. Killdeer, Watford, or New Town are 40 miles. We do not have a grocery store in the Mandaree area, and that is such as you would be accustomed to having. We have a place where they sell pop and candy and gas and maybe some snack foods and stuff like that.

But anyway, when I surveyed the people, and I surely did not get to all of them, I talked to some. And they did not think that hunger as such was a problem; it was poor nutrition. And their concerns were about too much fat, salt, and carbohydrates in the commodity foods, and they feel they would appreciate anything that the Congressmen could do to change that, possibly adding some fresh fruits in season, like apples, oranges, and grapefruit, that are not a real storage problem. And onions too. I want to mention that Dolores Sand, Mary Edith Good Bear, and myself have worked for the expanded nutrition for 18 years. Dolores has worked in the area of 18 years, and we contact families on an individual basis every month. I would say we meet 35 families within the area every month. But over the year I do not have the statistics to give to you so I do not know how many people, because we also meet with and give nutrition lessons, food demonstrations, and so on to groups of people, senior citizens and family groups, and so on.

Although we work on a part time basis, we do what we can with our job. But I really do not think it is how much time you have to teach, or how little time you have to teach. It is whether the material that you are teaching is relevant to the needs of the people. I do not think that we need to know how to make beef stroganoff. We have to learn to make better use of what we have, and this is what we have been striving to do.

The Hot Lunch Program at the Mandaree school does an excellent job of introducing the students to a variety of foods and meeting the nutritional needs during the school year, and they have a Breakfast Program too. But they do not have a lot of nutrition education as a classroom study.

The suggestion I would have would be to have nutritional education teaching centers at each segment and the commodity distribution center.

I do not think that it would be a good idea to centralize such a center at New Town because of the distances that people would have to go to take advantage of such an educational facility. Some of the classes that I think would be important would be food preparation, care and nutrition for infants and children, special diet food preparation. As program assistants—it is Sister Anna Rose's job to make the special diets—we only, our job is to help people to prepare the food within the diets as much as we can.

Unemployment, alcoholism, poor health, and the displacement from their natural home are the biggest heartaches for everyone living on the Fort Berthold Reservation. Hopefully, through approaching these problems locally we can relieve, if not cure these problems.

Thank you for your attention and for inviting me.

[The prepared statement of Ms. Danks appears at the conclusion of the hearing, see p. 48.]

Chairman **Leland**. Thank all three of you very much for your testimony.

Mrs. Chase, let me ask you, do you have any children with diabetes?

Mrs. **Chase**. Yes, I do.

Chairman **Leland**. How many of them have diabetes?

Mrs. **Chase**. Well, our oldest boy had diabetes, severe, and he died with complications from that diabetes. And before me——

Chairman **Leland**. Can you pull your microphone just a little closer? I am sorry.

Mrs. **Chase**. And before me, my parents, my father had diabetes, and he died in 1938, I believe. Other than that, I do not know. I do not think there was so many diabetics. We had a hospital there, but there was no such a thing as a diabetes clinic, such as there is today. Today, when you go to the clinic, that lobby there is just packed with people; diabetes, diabetes.

Chairman **Leland**. That leads me to the next question. Do you know of any tribal members who suffer from diabetes who have not been able to get to town to see a doctor or to the hospital when they need to go?

Mrs. **Chase**. Well, I have had that experience myself. There was a lot of times that I ran out of medication, nobody came, bad roads in the winter time. I lived out in the country not too far from the highway, but you could not get to the highway, and needing hospital care I was just at a loss. My husband is a sick man. He is on dialysis and sometimes he becomes sick and I am there alone with him. I have a phone, but who can I call, 30, 40, 50 miles away from my home? I have a very hard time.

So the housing authority pitied us and provided an elderly home, that we were one of the priorities, and I moved into town. But it is not home to us. I would rather be home.

Chairman **Leland**. I understand. Sister, how does the diet nutritionist's counsel a person to eat differ from the food package offered in the Food Distribution Program?

Sr. **Anna**. How do we do it different?

Chairman **Leland**. Yes.

Sr. **Anna**. Basically, what I would do is work with the client to find out what foods they are consuming, then help educate them to see where they might make changes in these types of food. Such as if we are using commodity foods, and there are a lot of high fat foods in it, butter, lard, shortening, helping them to realize that frying food is not the best way to use these foods.

Chairman **Leland**. I believe we have sent you the U.S. Department of Agriculture's recently published report evaluating the food package and nutrition education components of the Food Distribution Program on Indian reservations.

What are the most important recommendations given to improve the food package for diabetics and potential diabetics, and what additional recommendations do you have for the ideal food package?

Sr. **Anna**. I believe with the food package there, to change would be to reduce the amount of sugar and fat in the total food package, look at the amount of sodium in the package, and then include nutrition education along with the Commodity Food Program.

Chairman **Leland**. Let me now go to Ms. Danks, if I may. I want to thank you for such great testimony, Ms. Danks. I am interested in knowing how the cost of fresh foods at stores on the reservation compares to those sold at large markets off the reservation.

Ms. **Danks**. Well, since most of our food places are off of the reservation, other than New Town, there really would not be an opportunity to compare, because they do not stock fresh fruit in our stores as a rule, because of the distance you have to transport. And we do not have trucks delivering out to these little stores either.

Chairman **Leland**. How often do people, on the average, have to go off the reservation to shop?

Ms. **Danks**. Most of the people, if they get their wages or, say, food stamps or whatever, most of them buy once a month, so they buy a volume of food. You do not go the store often, when it is 45 miles away.

Chairman **Leland**. Mr. Penny.

Mr. **Penny**. Thank you. I am curious to know about the intervention programs that are necessary, and whether we are able to do more through our School Lunch Programs or Breakfast Programs. Is there more we can do in those early years to prevent against the likelihood of diabetes developing later? I know we have the Hot Lunch Program at noon and most kids are in school, so they are at least getting the benefit of that. But can we supplement through the schools to a greater degree than we now are?

Ms. **Danks**. I think that there could be more, if we got it presented to the school when they are scheduling, then we could schedule more nutrition education in the classroom. But the school in Mandaree—now, I cannot talk for the other schools in the area because I do not know—they do have contests, nutrition contests and so on. The kitchen sponsors, National Nutrition Week and so on. They do have special things then.

And another thing that we do is have cooperative efforts within the community to plan menus, and the kids and some of the parents and myself and the staff there, we do things together a lot of times, to get things that are common and they have in their diet. We follow the basic food groups, but to get what they like to have in their meals. Does that answer?

Mr. **Penny**. That is helpful. I appreciate that.

Ms. **Danks**. Yes, I believe that nutrition education should be a part of a full School Lunch Program; not only the lunch program, but it should also be in the curriculum from kindergarten through high school, that every classroom should be exposed to nutrition education and fitness programs. This is not being done.

Mr. **Penny**. Thank you, Mr. Chairman.

Chairman **Leland**. Mr. Dorgan.

Mr. **Dorgan**. Mr. Chairman, our next panel is a panel of some medical witnesses who are doing expert research in this field, and I think because of the time I am not going to ask you any specific questions. But I do want to say to Sister Anna Rose and Mrs. Chase and Ms. Danks that your testimony has been very, very good, and it is very useful for this committee when we try and shape recommendations on what sort of things we might be able to do, whether it is in any number of feeding programs or other nutrition education programs. Your testimony is going to be very helpful in allowing us to make some good decisions in that area, and I appreciate it.

It is one thing for experts to get up and testify, because they are often called to do that. It is another thing for those of you who do not testify a lot. Mrs. Chase, my guess is that you do not testify every morning, and it is not easy to get up in front of a lot of folks. But what you shared with us is very special and very important. I just want to say thanks to all three of you.

Chairman **Leland**. Let me echo the sentiments of the gentleman from North Dakota and thank you very much for your participation here today. [Applause.]

Our next panel consists of three individuals and they are, Dr. Peter Bennett, who comes to us from the southwest where he works as the Chief of the Clinical and Epidemiological Branch of the National Institute of Diabetes, Digestive and Kidney Diseases of the National Institutes of Health. He is a well-known expert on diabetes among American Indians and has spoken throughout this country and around the world on this topic. He will address his current research in this area based on work with the Pima Indians in the southwest.

We also have with us Dr. James Brosseau. Dr. Brosseau is a physician at the Grand Forks clinic who worked previously on the Fort Berthold Reservation investigating the problem of diabetes and its genetic roots. He will provide us with an understanding of the medical literature on the causes and serious health consequences of diabetes for American Indians, with some specific insights from his work locally. We also have Ms. Gretchen Chesley Lang. Ms. Lang is a Doctor of Anthropology. She is currently Associate Professor of Cultural Anthropology at the University of North Dakota in Grand Forks. She will discuss her research and personal experience working with the Indian Health Services Special Demonstration Diabetes Project at the Fort Totten Reservation.

Thank you all for coming this morning, and let me ask that you proceed, Dr. Bennett.

Mr. DORGAN. Mr. Chairman, might I before Dr. Bennett proceeds tell the audience that Dr. Bennett has made a very special effort to be here. I know that he has had schedule difficulties and I called him from Washington last Tuesday; he was in Phoenix. I know he had schedule problems. I just want to say a special thanks on behalf of all of us. You are the expert in this field in this country and the one we wanted to hear from. We especially thank you for rearranging your schedule.

Chairman LELAND. Thank you very much, Dr. Bennett, for the trouble that you have gone through to be here.

Mr. BENNETT. Mr. Chairman and members of the committee, I thank you for those kind words.

STATEMENT OF PETER BENNETT, CHIEF, CLINICAL AND EPIDEMIOLOGICAL BRANCH, NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES, NATIONAL INSTITUTES OF HEALTH, PHOENIX, AZ

Mr. BENNETT. Mr. Chairman, members of the committee; I am Dr. Peter Bennett, Chief of the Phoenix Epidemiology and Clinical Research Branch of the National Institute of Diabetes, Digestive and Kidney Diseases. I am very pleased to have this opportunity to testify before you today about our research efforts to investigate the occurrence and causes of diabetes mellitus and its complications among Native Americans.

In view of the time constraints I am just going to read excerpts from my written testimony which——

Chairman LELAND. Without objection your full testimony will be entered into the record. We appreciate your summary of the testimony.

Mr. BENNETT. Thank you, Mr. Chairman.

Our Institute initiated the investigation of diabetes among the American Indians in 1965. The first investigation conducted among the Pima Indian community in Arizona showed that diabetes among the Pima was 10 to 15 times as frequent as in the general

U.S. population at that time, and that among those with diabetes the characteristic complications of the disease such as diabetic retinopathy and diabetic nephropathy—that is, kidney disease associated with diabetes—occurred with frequencies similar to those reported among diabetics of other ethnic groups elsewhere.

This extraordinary finding led to the immediate decision by the Institute to establish a longitudinal study of the population in order to determine the reasons for the high frequency of the diabetes, define its determinants—that is, the causes of diabetes in the population—and to investigate the development or natural history of the disease and determine the causes and natural history of the specific complications.

This course of action was determined as necessary if we were to have a full understanding of the pathogenesis of the disease and its complications, which are the basic prerequisites to the design and institution of scientifically based methods of treatment and prevention.

We continue studies of the disease and its complications among the Pima today.

Diabetes among the American Indians is almost exclusively of the non-insulin-dependent type. This type of diabetes accounts for about 80 to 90 percent of diabetes in the United States in general, and an even higher percentage worldwide. Usually it attacks people of age 40 years and over, in contrast to insulin-dependent diabetes, which usually attacks children and adolescents. Nevertheless, both types are associated with a similar spectrum of complications although the underlying pathogenesis of the two diseases is quite different.

Among the American Indian diabetes was reported to be rare before 1940, and indeed, up until the early 1960's Alaskan Eskimos and Aleuts appeared to have very much less non-insulin-dependent diabetes than other Americans. However, the disease appears to have become very much more frequent in recent years among all American Indian tribes. In the Pima Indians, for example, there was a 40 percent increase in the age-adjusted prevalence of the disease between 1967 and 1977, and the incidence—that is, the rate of development of new cases of the disease—increased to a similar degree during the period centered around 1970 and 1980.

Certainly among the Alaskan Eskimos and Aleuts the disease is no longer rare today. Among the American Indians the prevalence of diabetes varies appreciably from tribe to tribe. Our studies in the southwestern United States have indicated that the Papago have a prevalence approaching that of the Pima, whereas some of the other tribes such as the San Carlos Apache and the Cocopah Indians have somewhat lower frequencies, but rates still much higher than in the Caucasian population.

A comparison of the rate of development of new cases of the disease among the Pima Indians with those of the predominantly Caucasian population of Rochester, MI, indicates that diabetes develops 20 times as frequently among the Pima as among the Rochester residents.

Most of the morbidity and mortality associated with non-insulin-dependent diabetes arises from the vascular complications associated with the disease. These complication complications include diabetic retinopathy, which frequently leads to blindness; diabetic nephropahy, one of the most serious and previously fatal conditions, which leads to end-stage renal disease; and an increased frequency of atherosclerosis which also leads to excessive frequencies of coronary heart disease, lower limb vascular disease, and cerebrovascular disease.

The vascular disease in the lower limbs is associated with much higher rates of gangrene and amputation that result in serious incapacity and disability.

Diabetic nephropathy is one complication that is relatively more significant among American Indian diabetics than among diabetics of other ethnic groups in this country, probably because of the earlier age at which diabetes usually develops among the American Indian,

A recent followup study of our own has shown that nephropathy was the underlying cause of death in 40 percent of the Pima Indians with diabetes over an 8-year period.

Our longitudinal study has shown that in those with diabetes of more than 20 years duration, more than 30 percent have developed renal insufficiency. This condition which, of course, was formerly fatal necessitates treatment by renal dialysis or renal transplantation for the continuation of life, imposing large demands on the health services and a tremendous burden on the unfortunate patients who must endure such treatment.

Among the Pima Indian population, dialysis at the present time on a per capita basis is 15 times as frequent as in the U.S. population, in spite of the Pima population on average being appreciably younger.

With the increasing frequency of diabetes during the past 20 years, we anticipate that the numbers of Pima Indians requiring such treatment will inevitably increase considerably in the forthcoming years unless some radical new approach to management of diabetic renal disease can be found. And indeed, our Institute is trying at this moment to embark upon an expanded effort to investigate the determinants of diabetic nephropathy in the Pima Indian population and to conduct controlled clinical interventions that may potentially delay or stop the progression of this complication.

The outcome of pregnancy is also influenced by non-insulin-dependent diabetes. Studies among the Pima have shown that the offspring of diabetic pregnancies suffer excessively high rates of morbidity in the newborn period and experience long-term sequelae such as extreme obesity and much higher rates of diabetes as adolescents and young adults.

While perinatal mortality rates remain high in the offspring of the diabetic pregnancy, this rate has fallen considerably in recent years, presumably as a result of improved medical care and management. The offspring, however, continue to be large for gestational age at birth and have a four- or five-fold increase in congenital anomalies or birth defects arising as a result of abnormal metabolism of the intrauterine environment during the first trimester of the diabetic pregnancy.

In terms of the causations of diabetes, our studies have emphasized both genetic factors and environmental factors. While there is today no doubt that genetic factors are an important prerequisite in determining the susceptibility of the individual to develop non-insulin-dependent diabetes, environmental factors play a critical role in determining whether or not the disease develops in susceptible individuals.

The increasing frequency of the disease over a 10- or 20-year period and the effects of diabetic pregnancy on diabetes in the offspring can only be attributed to the effects of the precipitating factors of the environment.

While the precise role in nature of the environmental factors as precipitants are only partially defined, we know at this time that obesity is an important factor that interacts with genetic susceptibility to determine whether or not diabetes develops and the age at which it does so.

The causation of obesity, however, is somewhat elusive in the American Indian, as it is in other ethnic groups. Certainly an excessive intake of calories relative to calorie expenditure is a prerequisite for the development of obesity. It is not known at this time whether or not this excess arises as a result of an increased calorie intake or a decreased calorie expenditure resulting from reduced physical activity, or possibly a metabolic abnormality that leads to lower than usual caloric requirements for daily living.

Our Institute is at this time undertaking a series of studies specifically designed to address these questions.

The current epidemiology and clinical research studies are certainly yielding a more in-depth knowledge of the pathogenesis of non-insulin-dependent diabetes in the population than ever before. We have learned from these studies that subjects with impaired glucose tolerance—that is, glucose tolerance levels which are less than those seen in diabetic persons but higher than those seen in normal persons—indicate that such individuals have a high risk of developing diabetes, although not all of them do so. This is true in the Pima, as it certainly is in other ethnic groups in various parts of the world.

Individuals with impaired glucose tolerance are subjects who are more likely to develop diabetes and these findings suggest therefore that this may be a group upon which individual efforts to reduce the risk or change the risk factors may be particularly beneficial.

The sorts of interventions that may prevent or postpone the development of diabetes may include dietary measures and differences in exercise, although the total effect of such preventive approaches has not been clearly demonstrated in a scientifically, totally acceptable manner. Nevertheless, it appears that among the American Indian where there are certainly large numbers of genetically susceptible individuals, and while we cannot specifically identify those individuals when they are totally normal, we can at this point in time identify them when they are at the stage of impaired glucose tolerance, and it is among such persons that it would seem appropriate to determine if dietary interventions and increasing physical activities can provide a means of either preventing totally, or at least postponing the onset of non-insulin-dependent diabetes, since this seems to be the most effective way by which we can prevent the ultimate complications of the disease.

Of course, we would be very pleased to answer any questions that I am able to answer.

[The prepared statement of Mr. Bennett appears at the conclusion of the hearing, see p. 129.]

Chairman **Leland**. Thank you, Dr. Bennett.

Dr. Brosseau.

STATEMENT OF JAMES BROSSEAU, M.D., INTERNIST, GRAND FORKS CLINIC, GRAND FORKS, ND

Dr. **Brosseau**. Thank you, Mr. Chairman. Gentlemen, I am Dr. Jim Brosseau. I am an internist and a diabetologist with the Grand Forks Clinic. I am also the president-elect of the North Dakota affiliate of the American Diabetes Association.

The American Diabetes Association has been supporting research in diabetes for a long time and we have been especially interested in the problem of diabetes among American Indians.

I would like to depart from my prepared remarks too, in order to avoid a lot of repetition.

Mrs. Chase earlier referred to the problem of smallpox many years ago wiping out many people of the Mandan, Hidatsa and Arikara Tribes. As a matter of fact, 150 years ago today the worst smallpox epidemic probably in the history of North America was raging right here on this Fort Berthold Reservation. During a 2-month period of time more than 50 percent of the Hidatsas and Arikaras died, and more than 90 percent of the Mandans died of smallpox in about 8 weeks.

I think it is fitting that we should be talking about another great epidemic today on this anniversary of one of the worst smallpox epidemics in history. As a matter of fact, Tuesday will mark the 150th anniversary of the death of Four Bears, the great Mandan chief for whom the bridge over the Missouri is named.

So while times change epidemics also change, and as we have heard from other people, diabetes is now the big problem; smallpox is extinct, but diabetes is becoming an ever-increasing problem. A few years ago a few of us came out and did a study of diabetes here and found that about 25 percent of the adult population of Fort Berthold were already diagnosed as having diabetes. We are doing another study today and I am quite sure that we would find that the rates have gone up a lot.

I would like to distinguish between the two types of diabetes, type I and type II. Type I is the type we usually see among children and this is a very dramatic disease; it comes on suddenly and requires immediate intervention with insulin. Without insulin people who develop type I diabetes will die very suddenly, very quickly. Type II diabetes, on the other hand, is much more insidious and it comes on very slowly, it comes to one's attention usually very slowly. In fact about half the people who have type II diabetes have yet to be diagnosed because they have no symptoms of it yet. Nevertheless, their blood sugar is high and the damage to their bodies is being done by this type of diabetes.

Thus, we think that while we know of maybe 20 or 25 percent of people in a certain group having diabetes, perhaps the rate is much higher.

Recently we did a death certificate study of all the people dying in North Dakota and found that by the time of death 17 percent have been diagnosed as being diabetic even though a cross-sectional study at any one particular time will show that 5 percent of the population has diabetes. So even though the rate is 5 percent, over a lifetime it is much greater than that. I think this means that diabetes will affect the majority of people in a high-risk population like we have here at Fort Berthold. I think this was alluded to by some of the earlier panel members.

One other thing I might say is that North Dakota also has the highest rate of diabetes among children of any State in the Union. We do not know why this is but our statistics are very conclusive in this regard. However, this type of diabetes is not an important one among American Indians.

The economic cost of diabetes is very great. It is far more than the cost of insulin and of course the emotional cost is much greater than just the shock of finding out that you are a diabetic and that you are going to have to live with a chronic disease for the rest of your life. There are many subtle ways in which diabetics are discriminated against, one of which is that you have to have special considerations before you can even drive your car if you have diabetes.

This condition goes on, whether it is type I or type II diabetes, and just simply whittles away at the body of the person with diabetes. As others have said, the eyes are affected, blindness or at least markedly reduced vision is common among people with diabetes. Many people needlessly lose their vision because of complications of diabetes. Kidney disease is very common. Renal failure, as Dr. Bennett said, necessitates transplantation, renal dialysis and so forth. Amputations of legs are very common. Hypertension often coexists with diabetes and adds to the morbidity and mortality, or the sickness and suffering, and so forth.

People of Native American extraction also have a much higher rate of gestational diabetes. That is, they develop diabetes while they are pregnant. And this too is often subtle and undiagnosed during the pregnancy and when it is finally diagnosed the mother may be quite ill. If she does not receive proper care during the latter part of her pregnancy there is a very great risk that she will have a baby who is unhealthy, may be stillborn, and this undoubtedly contributes at least to the high rate of infant mortality among Native American populations.

Now, prevention is our goal. This type II diabetes being more of an insidious disease and one in which the person retains some ability to secrete insulin may actually hold out some hope for treatment more than type I. Type I patients will always require insulin but type II patients can often be controlled through proper dieting and through supplement supplementation of their diet with certain medications which may include insulin. However, if the person with diabetes can be reached early on in the course of his disease maybe he can be changed so that his diabetes can be controlled and therefore the complications prevented.

For those people who have diabetes we have to get this program going right away. For those who do not have diabetes we have to do our best to prevent it by counseling them on what they may do to avoid getting diabetes, and of course early intervention for those who do develop the complications. Thank God we do have many medical treatments available for those with early forms of eye disease which, if given, can prevent blindness. Those include laser treatments. There is also vascular surgery, bypass surgery, and so forth. These are all very possible nowadays. However, they take an economic and an emotional toll of the person who has to have them too.

I think I will conclude at this point but I will be willing to answer any questions that you might have.

[The prepared statement of Dr. Brosseau appears at the conclusion of the hearing, see p. 51.]

Chairman LELAND. Thank you, Dr. Brosseau.

Dr. Lang.

STATEMENT OF GRETCHEN CHESLEY LANG, ASSOCIATE PROFESSOR OF CULTURAL ANTHROPOLOGY, UNIVERSITY OF NORTH DAKOTA, GRAND FORKS, ND

Ms. LANG. Thank you, Mr. Chairman. My name is Gretchen Lang and I am a medical anthropologist on the faculty of the University of North Dakota. Since 1981 I have been looking at community perspectives on health and health care at the Devil's Lake Reservation community, with a particular interest in patient and community perspectives on diabetes and its management.

My study involved interviews and interaction with diabetics and their families, the diabetes program that is located at Fort Totten Public Health Service Clinic, the Office of Tribal Health and the Tribal Health Committee, as well as dozens, maybe a hundred community people who also are concerned about the increasing prevalence of diabetes at Fort Totten.

I will not go into the statistical details because so much has been covered already, except to say that at the Diabetes Program office in 1985, 163 diabetics were registered out of a total of 657 people 35 years and older, which made about a figure of 24 percent, then, of older people who had type II diabetes. And there are further statistics at the Diabetes Program office now that would indicate a higher percentage.

I would like to briefly, comment on the history of foods and diet in this community. I think that there are parallels with the population who live at Fort Berthold even though, of course, the Dakota Sioux people have a quite different culture originally than do the Mandan, Hidatsa and Arikara.

The Sioux, the Dakota were not agriculturalists though in the woodlands of Minnesota, before they moved out onto the plains, they did a minimal amount of raising corn and a few other food plants. They were primarily hunters and gatherers. So their backgrounds are different in terms of subsistence, but the reservation experience since the late 1800's has been probably much more similar and there are parallels, then, in their dietary history so that people here at Fort Berthold might make some comparisons with what I say about the Dakota.

Food preferences and contemporary dietary patterns at Devil's Lake reflect both cultural/historical factors, including a major subsistence shift during the past century into the reservation mode of life, and also situational factors that in a very general sense be related to rural poverty.

As I mentioned, the early Dakota subsistence pattern was hunting, fishing, and so forth, and as they moved out onto the plains and adapted their diet to the prairie resources their lifestyle centered very much around a most important symbolic being, which was the buffalo, for their nutrition and of course a very significant part of their cosmology.

Today people are very nostalgic and talk very much about the old subsistence pattern, the traditional foods. Diabetic people with whom I would talk in their homes would quickly turn the conversation from the immediate discussion of diabetes and their particular challenge of managing it, to reminiscing about the purity and strength of the wild foods and the traditional foods. They are very realistic and realize that they cannot have a complete diet of those foods today, but they have a very strong sentiment about this kind of food.

I think this is a good sign, that people are very aware of healthful properties of foods, but that the immediate situational factors in their lives make it difficult to follow a particular health pattern. Like other Americans, they are very aware that the natural foods are probably more ideal.

At present at Devil's Lake the actual dietary patterns are not ideal, and I think some of this material was covered adequately and well earlier today in other testimony. I will briefly summarize by saying that probably the basic staples are potatoes and bread products. There are not too many households that have active gardens; I think probably about 10 percent. It is most often older people who raise the traditional Indian corn, because it is their special variety of corn, and who will store some of the vegetables that can be dried in the winter in cellars. While refrigeration and electricity are present today in most homes, this has not necessarily been the case in the past.

Commodity foods are used by what I estimate to be about 85 percent of households, but apparently this figure fluctuates from month to month as far as people who qualify.

The commodity food program provides canned meats, canned vegetables, canned fruits, macaroni, rice, flour, sugar, salt, shortening, and peanut butter among other foodstuffs. In many households, of course, in the majority of households, these form the basis for the diet and thus fry bread, pan bread, oven-baked bread and rolls, fried potatoes, bacon, eggs, rich soups and stews—preferably beef; they are very adamant that they are beef eaters there at Fort Totten. Food preferences vary from reservation to reservation. Sweet rolls, cakes, doughnuts and cookies—as were mentioned earlier—are frequent components of large family meals, along with the canned fruits and vegetables. The food groups that are underrepresented are usually the green leafy vegetables and fresh fruits, and while people do shop for additional foods than the commodities, such as meat, at several small local stores or in Devil's Lake, which is about 13 miles to the north, in general their basic diet centers around and is developed from the Commodity Food Program.

We know that the Commodity Food Program was not designed as the basic household diet, the ideal diet, but this is how it is used.

It should be emphasized that there is the nostalgia for the traditional foods and an awareness of their sacred properties. There are what are called Indian foods today that you will find at ethnic festivals, pow-wows and so forth, that include fried bread which is a native, pan-American favorite; and rich stews that have lots of the introduced white man's foods in them, and of course these have been tranformed by Indian people into their own ethnic favorite foods. I think that when we talk about foodways it is very inportant to realize how intertwined social and family life and ceremonial events are with particular foodways. It is not easy to change dietary patterns,

The Indian foods will often incorporate the original traditional items like prairie turnips and wild onions and chokecherries and such items, but they are not usually in very large abundance.

So, as an anthropologist I would like to emphasize the importance of understanding the foodways and what, in a sense, the emotional attachment is to foods in a community. The ironic aspect that the older people at Fort Totten recognize is that while they say, on one hand, "White man's foods have made us sick", in a sense, when they talk about the etiology of diabetes, they also know those are the foods they like and have certain attachments to as symbols of group identity. In other words, foods are ethnic markers. This kind of contradiction in the meanings of foods has to be understood by health professionals who work with people and try to suggest ways in which they are going to change their diet.

We all know how hard it is to be on a diet of any kind and all diabetics find diabetic diets difficult.

My recommendations are extremely similar to Sister Ruhland's, I think it was, in the three categories. So I will just simply mention them by title and then submit those in written form.

The first is the need for dieticians specifically to work with diabetics. I was able to observe this happening at the Indian Health Service Diabetes Program Office at Fort Totten Clinic. I found a number of positive factors in the Diabetes Program that patients appreciated, such as home visits and individualized attention. They often sought out this office, almost as a health advocate. They would go in with other problems too, and then be channeled on into the busier, larger clinic. They found this office a place where they could go as a starting point, an extremely valuable stepping stone to the rest of the clinic.

I could go on and on. I think that that program has made quite an effort to make their education culturally sensitive.

The second is the need for direct community involvement in preventive health. There are mechanisms in place. The main one that I have observed and am familiar with at Fort Totten is the Tribal Health Office and the Tribal Health Committee. These are part of tribal government. The tribal health sector can be an advocate for patients in the community, and also is very powerful in the sense that they can work, then, with people in the clinic. I think structurally that we have the mechanism there and that it is a matter of each community, then, taking advantage of this possible cooperative effort.

North Dakota is fortunate in that the American Diabetes Association Chapter has provided a significant amount of continuing education to people working with diabetes in Native American communities and I hope, with funding, that they can continue this effort.

The nursing and the medical school at the University of North Dakota are very aware that cross-cultural training is important in the medical curriculum, and Native American tribal leaders are extremely interested in bringing out traditional values of well-being and health, but it is only at the specific level that these cooperative efforts can be tried, by trial and error, to discover what kinds of programs might work in a given situation. For example, what are the metaphors involved in illness and in diet, that I think can only be worked out if people realize that two cultural traditions are involved, the local particular one, whatever it is, Dakota or Arikara or whatever, and the culture of biomedicine, which is a different cultural tradition.

And finally, I would recommend a modification of the Commodity Food Program. I have almost identical comments, I think, to Sister Ruhland's suggestions there.

So I would like to conclude my testimony, and thank you very much for this opportunity.

[The prepared statement of Ms. Lang appears at the conclusion of the hearing, see p. 62.]

Chairman Leland. Thank you, Dr. Lang. I thank all three of you. Let me say that you have given us very good testimony. We have questions which we will submit to you in writing.

I would like to keep the record open for the purpose of corresponding with you and getting your written responses. Because of time constraints we are going to have to move on.

I understand that the gentleman from North Dakota does have one question that he would like to ask at this time.

Mr. Dorgan. I would like to ask a question. Perhaps it would relate more to Dr. Bennett and Dr. Brosseau. The question is, how do you feel the National Institutes of Health could target increased research efforts in the areas we are talking about? Do you have any observations about how the NIH can target research efforts?

Mr. Bennett. Well, our Institute and the mission of our own particular branch is to perform research in diseases which are particularly prevalent among the American Indian population and translate those findings in collaboration with the Indian Health Service into practice.

I do not want to make specific recommendations that pertain specifically to policy or to budgetary matters.

Mr. Dorgan. Thank you,

Chairman Leland. Thank you all for your contribution. Thank you so much. [Applause.]

Our next witnesses represent the final panel that we have today. Your patience has been great and we really appreciate it.

Mr. Dorgan. Mr. Chairman, while you do that, might I recognize a couple of dignitaries in the crowd? We have a couple of state legislators and some others, and if the chairman will indulge me, let me say that the Trenton Tribal Council representatives are here or have been here.

We have with us State Representative Dick Solberg in the back of the room, a friend; and another friend, State Representative June Enget. June, you are in the back, and you have been here at the hearing; right back over there.

Sam Keeney, the mayor of New Town, is here. Sam is right back there. And William Woods from Parshall; a new business in Parshall. Clare Aubol, former State Representative from New Town. Clare has been here this morning, I know; over on the left. And Irene La Fontaine from the North Dakota State Indian Affairs Commission.

And there are other members, I believe, of the Three Affiliated Tribal Council here as well today. You might raise your hands, too.

I did want to just make note of some special friends and some State officials who are here as well.

Chairman LELAND. We appreciate that since our problems and the solutions to those problems lie not only national, but the local level as well. We appreciate the attendance of those who have impact on the local community.

Let me now introduce our last panel. Dr. Terrence Sloan is the Director of the Aberdeen Area Indian Health Service, based in Aberdeen, SD. In this position he administers the health programs funded by Indian Health Services for North Dakota, South Dakota, Nebraska, and Iowa.

He will provide a health profile of Fort Berthold and the Aberdeen areas. I hope that he can also tell us about the Agency's efforts to meet the health service needs of each service unit, particularly as associated with nutrition-related health problems.

We also have with us Mr. Alonzo Spang. Mr. Spang is the superintendent of the Fort Berthold Agency, Bureau of Indian Affairs. Today he will discuss the poor economic conditions at Fort Berthold as well as efforts that the Bureau is making, along with the Tribal Council, to address the causes and consequences of the high poverty rate in this area.

We thank you gentlemen for your participation today. You may begin, Dr. Sloan, please.

STATEMENT OF TERRENCE SLOAN, M.D., DIRECTOR, ABERDEEN AREA INDIAN HEALTH SERVICE, ABERDEEN, SD

Dr. SLOAN. Thank you very much, Mr. Chairman, Congressman Dorgan, Congressman Penny, Mr. Lone Fight, and distinguished council members of the Three Affiliated Tribal Nation.

It is indeed my pleasure and honor to be able to present information to you regarding the health status of the American Indian in the Aberdeen area, and specifically with regard to the Three Affiliated Tribal Nation.

I want to commend you on your interest in the health care of the American Indian. It is indeed a welcome event that you are here to hear some of this very valuable testimony.

I am American Indian. I am a physician, and Director of the Aberdeen Area Indian Health Service.

I would like at this time to digress from my written testimony. You have that in front of you and it certainly is self-explanatory.

Chairman **Leland**. Your entire testimony will be entered into the record without objection.

Dr. **Sloan**. Thank you. I would as well hope that Miss Gabor made available to you a group of tables that I would like to take you through. Do you have those in front of you?

Chairman **Leland**. We do have them.

Dr. **Sloan**. I will quickly take you through these and I think they will tell a story that will help you in your decisionmaking capability.

The first table is specifically the household characteristics of the U.S. general population and the Indian Health Service service population. What you should concentrate on is the top three lines. And to summarize what it shows, the American Indian in the Aberdeen area has relative overcrowding with more people per household, they have a higher percentage of unemployed individuals so there is a very high poverty level, there is still a significant portion of the population that has a complete lack of plumbing and no sewage disposal, and most importantly in a very remote area, in a frontier area, a significant portion of the patient population of the households, over 50 percent, have no telephone and only one in five households has any access to a motor vehicle. This makes a tremendous difference in the design of a health care delivery system.

Additionally, one must note that the median age of our population is 17, meaning 50 percent of the population is below that age,

If you will turn to table 2, I want to bring to your attention that there are 12 areas in the Indian Health Service, and these are listed on the far left. The two areas with the highest age-adjusted mortality rate for all causes of death are the Aberdeen area and the Billings area. You can see that the age-adjusted mortality rate is approximately twice as high as the average U.S. Indian.

If one then looks at the next table, I want to make you aware that the tribal population of the Three Affiliated Tribes has indeed a very high age-adjusted death rate and if you look toward the bottom of the page you can compare that to the "United States, All Races" and the American Indian.

If you go to the next table, what you find is a breakdown of the selected causes of mortality, and one finds that the leading cause of mortality in the Three Affiliated Tribal Nation population, as well as the Aberdeen area, is major cardiovascular disease. Thirty years ago the major cardiovascular disease that we saw in the American Indian population was valvular heart disease secondary to rheumatic fever. That has largely been treated with antibiotics and now we are dealing with the disease called ischemic heart disease, and that in fact is a major problem in our area. Contributing factors include a high prevalence of diabetes, hypertension, smoking, and dietary habits that are cholesterogenic.

In addition one sees malignant neoplasms as being a major contributor. In general, neoplasia is not a major problem for the American Indian. In this area it is, and the difference is the incidence and prevalence of lung cancer. We have a population that smokes heavily. Alcoholism is a major contributor; accidents as well.

If you go to the next table, what one finds, if you look at a piece of data called "Years of Productive Life Lost"—and this is obtained by subtracting the age at which someone expires from 65, you multiply it times the number of deaths, and you divide it by 100. What one finds is that for the Aberdeen area, and specifically for Fort Berthold, a very high rate of years of productive life lost.

If one looks at the major cause of that mortality—and this continues to be a problem for the Indian Health Service nationally—you find that the prevalent cause is accidents, specifically motor vehicle accidents. And I can assure you as a clinician that 90 to 95 percent of those deaths are related to alcohol and substance abuse.

If you go to the next table you will find that the Aberdeen area along with the Billings area leads the Indian Health Service in years of productive life lost.

If one then looks at the next table, what you see is a comparison of Indian Health Service areas, age-adjusted mortality rates for cardiovascular disease, what one finds is that in the Aberdeen area the mortality rate for cardiovascular disease is approximately two times the national Indian Health Service average.

If you go to the next table, what you find is the age-adjusted cardiovascular death rate for Fort Berthold is again about two times the American Indian rate.

The contributing factors remain the same: that of a high prevalence of diabetes, smoking, hypertension, and a diet that is laden with lipids or fat, and are cholesterogenic.

Most importantly, if you go to the next graph, it shows the age-adjusted mortality rate for diabetes mellitus among areas. The feeling in this country was that the major problem with diabetes rested in the southwest Indian population. Surprisingly, we began to look at the data and we realized that in the Aberdeen area the American Indian leads the Indian health areas in diabetes-associated mortality as well as renal disease secondary to diabetes.

We are still exploring all the causes of this, but in general it follows the pattern of being predominantly type II, or non-insulin-dependent diabetes.

We feel and would welcome more research, specifically in this geographic region of the country, regarding this disease so we can begin to combat it from a baseline level.

If one looks specifically at diabetes mellitus death rates in the Aberdeen area, one sees that the Fort Berthold population has a rate that is 10 times the United States, "All Races," and 5 times the American Indian population rate.

I would like to direct you to the next table which is very important. It is crude infant mortality. If one compares the health status of differing populations in the world, the most reliable factor is that of infant mortality. One can see that the infant mortality in Fort Berthold and in the Aberdeen area is extremely high. It is probably the best figure that tests the ability of a health care system to intervene appropriately for a given population.

If one goes to the next table and you find out what the breakdown is on those infant mortality deaths, one sees that the primary period of vulnerability is between 28 days and 11 months. In fact, much of the mortality in the birth process or immediately following the birth process is actually lower than the surrounding United States, "All Races," population. This follows nationally for the Indian Health Service.

This is not surprising if one considers the first set of charts that I presented to you which showed the remoteness, lack of vehicle, lack of telephone, in many cases lack of appropriate water supplies. All these are very important in the viability of an infant as well as the parenting skills and whether or not there is alcoholism and smoking in the household.

The next set of charts are very important. They are a little more complex. I would like to take you quickly through them. What they show, essentially is the expenditures per capita and per workload unit in the Aberdeen area for various facilities. We analyze these very carefully.

If you go to the right you will see an "FB." That is Fort Berthold. "FT" is Fort Totten, and "PI" is Pierre, and "AA" is the Aberdeen area. To the left all these facilities have hospitals and/or major health facilities. What you see is a decreased expenditure per capita in those facilities that have health centers. You see an increased cost per clinical unit or workload unit. This disparity would indicate that there are less people that utilize these facilities, but when they do there is a higher cost associated with that.

If you then go to the next page and you look at contract Health Service expenditures per capita and per clinical unit, you find that in our health centers there is a very high cost per clinical unit and again a very low cost per capita, indicating that perhaps there is not appropriate utilization in our health centers.

If one looks at the hospital and clinics and Health Service dollars per capita and per workload unit, there is a similar type of finding.

We have a process where we collect third-party resources. These are called Medicare and Medicaid resources and the authorization is received through Public Law 94-437, or the Indian Health Care Reauthorization Act.

What one sees is a decreased ability of health centers to collect third-party resources. These are returned back into their programs to develop an effective primary care system.

If you add all three categories of fundings together, you find the continued disparity.

Let me bring to focus the point I am trying to make. In this data I related to you factually that the areas with the two highest mortality patterns are the Billings area and the Aberdeen area.

The Billings area currently receives the highest per capita contract Health Service dollars in the entire Indian Health Service. When one analyzes the mortality rates—and I would ask you to think those over carefully—what one would have to surmise is, the only way to directly impact upon those mortality rates is through an effective, well-directed, access-oriented primary care program that involves all the elements of adequate preventive care.

The fact that we have not been able to succeed in altering mortality rates by increasing contract health care funds is not surprising if one considers the remoteness and the types of disease prevalences we are dealing with. What I would suggest is that the way to correct mortality patterns is by effectively building a primary care, access-oriented, preventive-oriented program that will have some capability to provide a wide range of services to people locally.

The effects of the Garrison Dam on this population, and the fact that it split up the reservation considerably and created remote areas where people could not gain access has had devastating consequences. The Indian Health Service is committed to building a direct care access-oriented program, but it will indeed require additional efforts, personnel; a different type of commitment on the part of the Indian Health Service and Congress. Thank you.

[The prepared statement of Dr. Sloan appears at the conclusion of the hearing, see p. 85.]

Chairman **Leland**. Thank you very much, Dr. Sloan.

Mr. Spang.

STATEMENT OF ALONZO SPANG, SUPERINTENDENT, FORT BERTHOLD AGENCY, BUREAU OF INDIAN AFFAIRS

Mr. **Spang**. Thank you, Mr. Chairman, and Congressman Dorgan and Congresman Penny.

My name is Alonzo Spang. I am the superintendent for the Bureau of Indian Affairs at Fort Berthold Agency. I am pleased to be here to discuss the socioeconomic status of the Three Affiliated Tribes of the Fort Berthold Reservation and the role of the Bureau of Indian Affairs.

Three tribes that are organized with a single tribal government are the Hidatsa, Arikara, and Mandan. The Three Affiliated Tribes is governed by a Tribal Business Council which is elected by the adult tribal members. The reservation population is approximately 3,150, although the membership of the Three Affiliated Tribes is 7,341.

The Fort Berthold Reservation includes the six west-central North Dakota counties of Dunn, Mercer, McKenzie, Mountrail, McLean, and Ward; and encompasses an area of approximately 1,550 square miles with 424,213 acres held in trust for the tribes or individual Indians.

There are two tribal contract schools, one cooperative school—public and tribal contract—and two public schools serving the reservation as well as a tribally controlled community college which provides many services and education opportunities to the reservation and surrounding communities.

The Fort Berthold Reservation is primarily dependent on agricultural activities for its economy, although there are some oil and gas resources on the reservation. The BIA Report to Congress on BIA agriculture and range programs, September 1986, stated:

> Indian farming and ranching enterprises differ significantly from off-reservation operations. Smaller scale, lack of sufficient capital, isolation, increased distance to markets and reduced land tenure terms contribute to a lack of long term stability and increased impact from short-term market fluctuations or adverse weather conditions. A general lack of resource development increases drought impacts on Indian land and results in a longer recovery period.
>
> A primary reason for the differences between Indian and non-Indian agriculture enterprises is that undivided and fractional heirship and tribal ownership prevent Indian operators from acquiring title to most of the lands in their operation. Indian farmers and ranchers are therefore dependent on leased lands with a term limited to 5 years by regulation. This results in a lack of collateral to support necessary capital acquisition and reduced involvement in USDA programs requiring long-term land tenure. As a whole these influences result in under-capitalized small-scale operations with minimal on-farm development, little stability, and complete dependence on fluctuating markets.

This description of the problems of the Indian farming and ranching enterprises adequately portray the problems encountered at the Fort Berthold Reservation.

The Bureau of Indian Affairs has been working with the tribes to find ways of expanding and developing the reservation resources. We are developing strategies for better use of water, to develop our range programs, and exploring the possibilities of providing short-term loans to accommodate the farming and ranching needs. Both the Bureau and the tribes are involved with the recently formed Indian Agriculture commission that has been developed to address the needs of agriculture-based Indian communities. We are hopeful that this commission can be helpful in finding new ways to study and resolve some of our short- and long-term economic problems.

The Bureau has worked closely with the tribes to assist them in developing and carrying out their own reservation programs. Currently the tribe has 17 contracts with the Bureau, and one with the Economic Development Administration to provide programs, studies, and special projects. A list of these contracts are attached to my statement.

This year the Bureau is providing a full-time staff person to the tribes through the Inter-Governmental Personnel Act to assist them in planning and mapping the reservation road system.

The Bureau also works with the Indian Health Service to provide coordinated services on the reservation. We are presently working with the tribe to develop and implement a tribal action plan to address the alcohol and drug problem as required by the recent Omnibus Drug Act. I will defer to my colleague from the Indian Health Service to speak more directly to this effort.

In summary, the Fort Berthold Reservation, like most Indian reservations in this country is economically depressed and suffers from the same physical and social ills of other Indian reservations. But the structure of the tribal government at this reservation is strong. This tribe will continue to manage its own affairs in working with the Bureau. We hope to find new ways of developing the reservation economy.

This concludes my prepared statement and I will be happy to answer any questions you may have.

[The prepared statement of Mr. Spang appears at the conclusion of the hearing, see p. 108.]

Chairman **LELAND**. Thank you very much, Mr. Spang. And let me say to Dr. Sloan, your testimony was incredible. The graphs and your relative comments were just outstanding.

I do not know if my colleagues have any questions that they might want to ask you at this time. We do have questions that we will submit to you in writing. As you know, we have a very tight schedule to follow today. I must say that both of your contributions have been invaluable.

Mr. **PENNY**. Mr. Chairman, if I might, I do not know that we heard in either of the gentlemens' testimony the number of clinics, health clinics that are present on the reservation?

Dr. **SLOAN**. Yes, there are—depending upon our staffing and our ability to staff those clinics, there are three direct care clinics on the reservation. There is one clinic that we are attempting to contract for care.

Mr. **Penny**. Are they located in a way that—you know, this reservation is divided by that reservoir. Are they located all on one side, or do you have them scattered about so that people do not have to go out and around to access that care?

Dr. **Sloan**. No, the clinics are placed reasonably strategically. However, there is difficulty in fully staffing those clinics, particularly with some of the specialties that we really need to make available to combat some of the high disease prevalence rates.

Mr. **Penny**. If you could better staff those clinics, would it be your intention as one priority to have some followthrough with these parents, or mothers of newborns, and to help during that crucial period where so many of these children are unfortunately dying?

Dr. **Sloan**. Absolutely. That is one of the major goals of our health care delivery system.

Mr. **Penny**. Thank you. Thank you, Mr. Chairman.

Chairman **Leland**. Thank you. I understand that the gentleman from North Dakota does not have any questions of the gentlemen here.

In conclusion, I want to thank several individuals who are directly responsible for the great success of this hearing. We really want to thank Mrs. Polly Marat and the staff of the New Town High School for the use of this facility and all of the resources you provided us.

We thank Ms. Mary Ann Kelly of the North Dakota Diabetes Association and Ms. Tilly Walker, whose idea it was to bring this hearing here. She talked with Byron and thought that it would be a great idea for the Select Committee on Hunger to conduct these proceedings. And let me also publicly thank Vivian Gabor, who is with the staff of the Select Committee on Hunger. This is her last week and her last hearing with the House Select Committee on Hunger, and we certainly want to thank her for her contributions.

Let me just also thank the chairman of the Tribal Council, Mr. Ed Lone Fight, for all that he has done to make us feel comfortable here, and the provision of all of the facilities and the great time that we are going to have in just the near future also, at lunch. Thank you so much.

I want to thank also the citizens of this reservation for coming out today. Your presence is, of course, participation with us. Let me not raise your expectations beyond reality, but let me say to you that what we have done here today will go a long ways in helping us to find long-term solutions to many of the problems that were raised here today.

The testimony of our witnesses has been excellent. We will take this testimony back to the Congress of the United States, do what we absolutely can, and I know with the leadership provided by your Congressman we will make a great deal of progrerss in combatting these adverse conditions. Thank you very, very much for your kindness and your participation here today.

This committee hearing is now duly adjourned.

[Whereupon, at 12:35 p.m., the select committee was adjourned.]

[Material submitted for inclusion in the record follows:]

PREPARED STATEMENT OF HON. MICKEY LELAND, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Thank you Congressman Dorgan for inviting us to visit the Fort Berthold Reservation. I also want to express my sincere appreciation to the tribal council of the Three Affiliated Tribes, to the tribal members who performed the introductory ceremonies this morning, and to the many others who have assisted in the arrangments for this hearing and the site visits we will make later on this afternoon.

Today we will hear testimony from distinguished witnesses concerning hunger and nutrition problems among American Indians. While the hearing today focuses on solutions needed to address the concerns of the Three Affiliated Tribes, we will also address the related concerns of Native Americans nationwide.

I arrive on your reservation aware of the grim social, economic, and health conditions of your people. I have read of the astronomically high unemployment rates on the reservation, which reach levels as high as 80 percent during the winter months. According to The North Dakota Indian Affairs Commission, the 1982 per capita income here is $4,069. This is less than one-half that of the total United States population. Additionally, the cost of basic necessities such as food and utilities is very high due to cold, harsh winters and limited physical access to retail food outlets.

I have learned of the devastating impact that the building of the Garrison Dam has had on your most fertile lands and on the infrastructure of your communities. I have seen the recommendations of the Garrison Unit Joint Tribal Advisory Committee, which seek to compensate the tribes for the negative impact of the dam on your economic, physical and emotional well-being. The Committee will examine the recommendations of this report along with other testimony presented today.

While health trends for American Indians have improved over the past decade, at many reservations the rate of serious health conditions has remained stagnant and has worsened in some cases. The health status of the people of the Three Affiliated Tribes is abysmal when compared with all American Indians and the total U.S. population.

Diabetes -- a malnutrition related health problem -- is the focus of our Committee's investigation today. This disease, which was rare among American Indians before the 1940's, has now reached epidemic proportions at Fort Berthold. In a 1986 report on the health care needs of the Three Affiliated Tribes, the University of North Dakota's School of Medicine reported that nearly one in three persons age 40 or older are diabetic. The death rate due to diabetes on the reservation, for the period from 1982 to 1984, is over three times the rate for all reservations in the Aberdeen Service Area and over seven times that for the U.S. total population. Not only is the death rate from diabetes higher than other areas, it has recently worsened. From

1974 to 1982 the rate increased by 179 percent. These statistics indicate a severe inadequacy in the quality of food assistance, education, and health services for prevention and treatment of diabetes.

We are here today to understand how the federal assistance programs designed for the specific needs of American Indians -- such as the Food Distribution Program on Indian Reservations and the Indian Health Service -- can better succeed in achieving their intended purpose of preventing hunger, poverty, and malnutrition. I am specifically interested in your recommendations regarding changes needed in the type of foods offered in the Food Distribution Program and the accessibililty of health services needed to prevent and treat diabetes as well as other nutrition-related health problems.

We look forward to hearing from our distinguished witnesses to learn how statistics and studies translate into everyday problems. I welcome your remarks not only on nutrition and health services, but also on social and economic improvements essential to prevent hunger and malnutrition on the reservation. It is my belief that improved economic conditions can provide the opportunities for improved health among all peoples around the world. Therefore, the critical influence of adequate income, access to a quality diet, and education in shaping the health status of American Indians all deserve serious attention.

Access to an adequate food supply is a basic human right. We are spending billions of dollars to stockpile nuclear armaments, but what good is building a technically strong national defense if we leave our brothers and sisters weakened by poverty and disease. We have seen how political will can work. Now we must direct this will to fight the battle against hunger and malnutrition. Thank you.

PREPARED STATEMENT OF EDWARD LONE FIGHT, CHAIRMAN, THREE AFFILIATED TRIBES

Chairman Leland, and members of the committee, my name is Edward Lone Fight. It is my pleasure to testify before your committee in my capacity as the Chairman of the Three Affiliated Tribes. Let me first express my thanks, on behalf of the full tribal council, to your committee for the concern and interest you have shown by convening this hearing regarding the nutritional and health care needs of the tribal people on the Fort Berthold Reservation.

The relevant statistics paint a stark, and shocking, picture of the present health care and nutritional status of the tribal people. The pertinent health care data, compiled and evaluated by the School of Medicine of the University of North Dakota in 1986, shows that the tribal people on Fort Berthold are subjected to a significantly inferior level of health and nutritional care. That recent study examined the statistical incidence of diabetes related deaths, infant mortality/morbidity, and alcoholism related deaths among the tribal people on the Fort Berthold Reservation. For example, the infant mortality rate at Fort Berthold is 32.8 per 1000 births compared with a 2.6 national average rate and a 13.3 rate for the entire Indian Health Service population. The diabetes mortality rate at Fort Berthold is 123.8 per 100,000 of population, compared with a national average rate of 9.6 and with a 10.9 rate for all American Indians. The alcoholism mortality rate at Fort Berthold is 200.6 per 100,000 compared with a 6.4 national average rate. The

Pierre Service Unit has the next highest rate, at 105.7, in the Aberdeen IHS Service Area. That report concludes that these statistics are all the more tragic when it is recognized that with only a modest increase in expenditure by IHS for improved health care delivery, and nutritional education, that many of these deaths could be avoided on Fort Berthold.

There are, Mr. Chairman, prudent and reasonable public health responses to these shocking Indian health care and nutritional statistics on Fort Berthold. The Three Affiliated Tribes urge this committee to support, in this regard, the recommendations of the Joint Tribal Advisory Committee (JTAC). That federal commission recommended that the Indian Health Service construct operate and maintain a primary health care facility on Fort Berthold that would emphasize the prevention and treatment of obstetrics, dialysis, alcoholism ,and diabetes related problems among the Indian people on Fort Berthold. The cost estimate for this modest facility is approximately $3 million to build, and $1.5 million to equip. This facility would also employ approximately 30 tribal members in various full time staff positions. It should be added that this federal commission found that the Three Affiliated Tribes, aside from the compelling statistical case presented, are entitled to this health care facility because the federal government had promised to build a replacement hospital facility, under Pub. L. 81-437, when the previous reservation hospital was destroyed in the 1950's as a result of federal action in the construction of the Garrison Dam and Reservoir.

Several health care experts, including professionals from the Indian Health Service, will testify regarding the health and nutritional needs of the tribal people on Fort Berthold. It is my belief that much can be done, through administrative and legislative action, to prevent these recurring tragedies on the Reservation.

This concludes my testimony, Mr. Chairman, and I would be happy to answer any questions you or your committee, may have.

Exhibits Submitted by Herbert J. Wilson, M.D.

Chart 1 (a)

NEW TOWN HEALTH CENTER

AVERAGE AGE OF DYING (TOTAL OF 1466 DEATHS)

Table #1

	INDIAN MALES	INDIAN FEMALES
1955 - 1964	53	51
[illegible] 1974	47	59
1975 - 1984	49	57

	WHITE MALES	WHITE FEMALES
1955 - 1964	61	66
1965 - 1974	66	72
1975 - 1984	66	76

65 ADMISSIONS-ALCOHOL CAUSED OR CLOSELY RELATED

Table #4

	INDIAN	TOTAL
ACUTE ALCOHOLISM	7	9
ACCIDENTS UNDER THE INFLUENCE	19	22
SUICIDE ATTEMPTS UNDER THE INFLUENCE	4	5
ACUTE WITHDRAWAL	6	6
CHRONIC ALCOHOLISM - CIRRHOSIS	13	21
MISCELLANEOUS	2	2
	51	65

PERCENTAGE OF DEATHS THAT WERE VIOLENT - 1466 PATIENTS

KNOWN TO NEW TOWN HEALTH CENTER

Table #2

	MALES		FEMALES	
	Nonindian	Indian	Nonindian	Indian
1954 - 1963	22%	50%	11%	20%
1964 - 1973	19%	36%	10%	29%
1974 - 1984	21%	37%	8%	30%

CHEMICAL ABUSE-RELATED ADMISSIONS OF DR. H. J. WILSON, M. D.
FROM JUNE 1983 - JULY 1985
TO STANLEY COMMUNITY HOSPITAL IN STANLEY, ND. [illegible]

TOTAL HOSPITAL ADMISSIONS - 366

NATIVE AMERICAN 161		GENERAL POPULATION 205	
MALE	FEMALE	MALE	FEMALE
67	94	89	116

CHEMICAL ABUSE-RELATED ADMISSIONS BY AGE CATEGORY (IN 10 YEAR INTERVALS)

TOTAL ADMISSIONS — 93

Table #5

	NATIVE AMERICAN 70		GENERAL POPULATION 23	
	MALE	FEMALE	MALE	FEMALE
0 -9 YR.	1	2	0	0
10-19 YR.	1	6	4	1
20-29 YR.	8	11	4	2
30-39 YR.	12	2	2	1
40-49 YR.	5	6	1	0
50-59 YR.	2	7	2	0
60-69 YR.	3	3	0	1
70-79 YR.	1	0	2	1
80-89 YR.	0	0	1	0
TOTAL	33	37		7

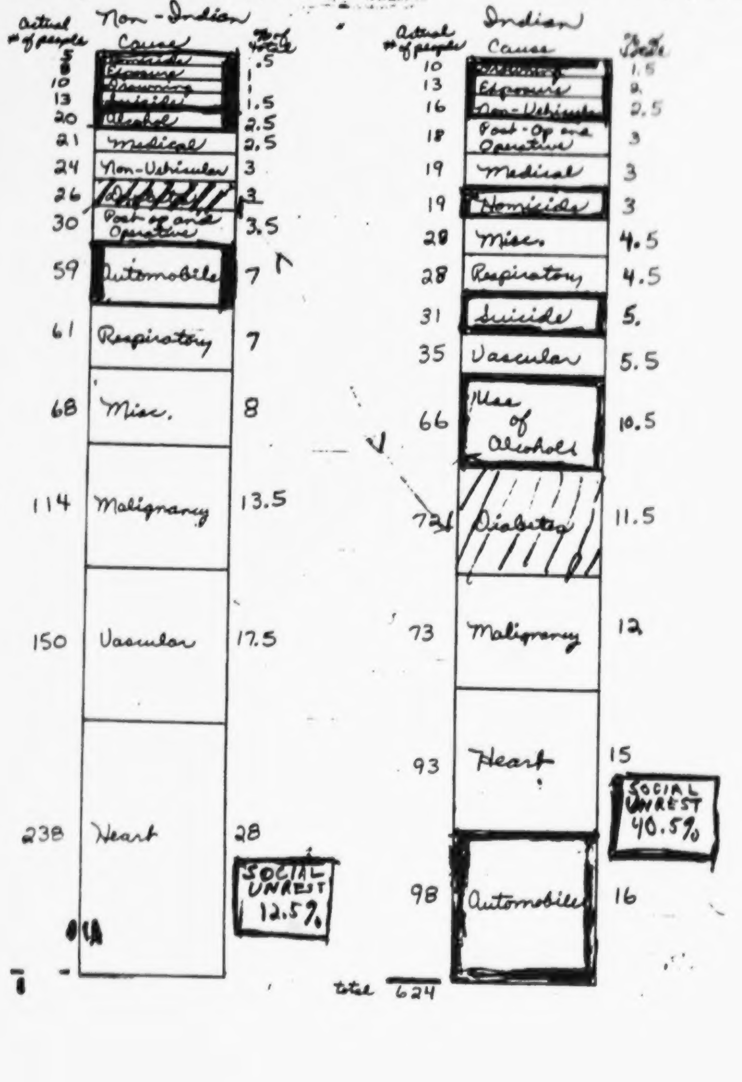
STANLEY COMMUNITY HOSPITAL—DR. WILSON'S SERVICE 1983 - 1985

100 ALCOHOL ADMISSIONS

Table #3

	TYPE
39	ACCIDENTS UNDER THE INFLUENCE OF ALCOHOL
27	CHRONIC ALCOHOLISM
14	ACUTE ALCOHOLISM
12	WITHDRAWAL AFTER LONG BINGE
8	OVERDOSE OF DRUGS WHILE TAKING ALCOHOL

Cause of Death (1954-1[illegible] New Town Health Center (over age of 17 yr)



PREPARED STATEMENT OF SISTER ANNA ROSE RUHLAND, TRIBAL NUTRITIONIST, FORT BERTHOLD RESERVATION

A Tribal Nutrition Program was not a part of the services offered by the Fort Berthold Reservation, Three Affiliated Tribes Government, in its 50 plus year history. Then in January 1980, through combined efforts of Tribal, Federal and State agencies a Tribal Nutritionist was hired to coordinate and develop these services.

The overall goal of Nutrition Services of the Three Affiliated Tribes is to increase the level of Nutrition awareness of residents of the Fort Berthold Reservation.

The people of the Three Affiliated Tribes suffer a multitude of health problems ranging from a high rate of accidents, heart disease, and diabetes to a rapidly rising rate of cancer. Diabetes as a secondary cause claims a significant number of lives of Tribal members. The disease is compounded by a tendency toward obesity. Yet many Fort Berthold residents are obese and practice poor nutritional habits.

The 1984 Fort Berthold Household survey (surved 70% of the Households and conducted by Nutrition Services) indicated that over 50% of the Households had someone with Diabetes and/or high blood pressure, and at least 70% of the households felt someone in the home could develop Diabetes.

Individual diet instructions indicate that patients are unaware of what causes Diabetes and how Diabetes might be prevented or delayed. The same can be siad for hypertension and heart related nutrition problems.

Intital contact with WIC clients indicates that mother/care takers are often unaware of relationship of infant/child health and poor nutritional care. Poor nutrition may lead to future health problems of obesity, Diabetes, and Hypertension.

Presently nutrition counseling services are provided clients through the Tribal Nutritionist, Nutrition Services, Three Affiliated Tribes, Tribal Office. The need for an adequate coordinated system of managed Nutrition/Fitness care is important if Fort Berthold residents are to be reached and served. Limited staff and time prevents Nutrition Services from adequately meeting the needs of the residents.

The Fort Berthold Reservation, has unique problems of long travel distances to community centers, health care, towns, and schools. Some people traveling 75-100 plus miles for health care and basic food needs. (Household Survey 1984). This travel is compounded with long, minus zero temperture, winters, limited gas funds or no mode of transportation, and poor road conditions. Therefore, it is important to develop a consistent and uniform strategy of Nutrition/Fitness Services for all segments of the Reservation.

In order to prevent or delay diseases such as Diabetes, Hypertension, and heart disease, health promotion and disease prevention need to be addressed with a strong Nutrition/Fitness component being a part of the program.

When Nutrition/Fitness education is provided in an easily understood method and addressed to the specific household and taking into consideration cultural and traditional food habits, nutritional changes are made.

WIC (Women, Infant, Children Special Supplemental Food Program) yearly nutrition survey (F/Y 86) indicated that 89% of those surveyed made changes in their eating habits because of what learned at WIC. Visits with the Nutritionist regarding nutritional needs, rated at the top in ways of learning. The F/Y 87 WIC Survey showed that 93% of the clients rated talks with the Nutritionist as an important Service. An indication of clients desire for learning about Nutrition/Fitness. The F/Y 87 WIC Nutrition Survey had 47% of the respondents desiring to learn more about Exercise, and 55% desired more information regarding weight control Twenty-three - forty-two percent also requested information regarding less fat, salt, sugar and increased fiber foods. A high indication of the desire to learn and change food habits.

Nutrition/Fitness education needs to be expanded to all Food Programs and people. In order to make intelligent food choices, people need to be informed.

The Nutrition related Programs (Commodity, Food Stamps, Aging Services, Headstart, WIC and School Food Service) should have written into the legislation of these programs funding authorized for Nutrition/Fitness personnel and programs.

Diabetes prevention needs to be addressed with a coordinated team effort of Phusican, Nurse, and Dietitian. Presently there are seven Diabetic projects in Indian Health Service. These projects need to be expanded to include all Indian peoples and specifically the Fort Berthold Reservation.

To prevent long range complications education needs to be addressed to the presently diagnosed Diabetic, the family, extended family and the school aged child.

Nutrition staff of Dietitian/Nutritionist, Home Economist and supporting nutrition aide staff need to be expanded so that Nutrition Education may be provided.

Nutrition food programs need to be available to all the people in all areas (communities) of the Reservation. Programs need to be net-worked for improved coordination. New and inovative nutrition programs need to be developed. This can only be accomplished when legislative funding is provided to meet staff needs.

It is important to educate the people to better use of foods so that nutrition related diseases may be prevented. The 1984 Household survey indicated that frying was a popular way of preparing foods and that there was a high frequency of foods such as cakes, doughnuts, and cookies. Where as the use of fruits, vegetables, and whole grains rated low.

There is a need for existing programs of Food Stamps, Commodities, WIC, Aging Services, Headstart, and School Lunch programs. F/Y 87 WIC Survey, indicated that 65% of clients also participated in Commodities or Food Stamp Program. Since a high number of households receive some form of food assistance this remains a primary way of reaching the people in regard to proper nutrition and fitness activities. For many, (mainly elderly and children) this may be the only means of food. To prevent regression in health the food programs are important to the people.

An expanded Nutrition staff (Dietitian/Nutritionist, Home Economist, and Nutrition aides) would be able to provide creative and meaningful Nutrition/Fitness Education Programs which would also consider cultural and traditional food habits.

PREPARED STATEMENT OF ELSIE DANKS, PROGRAM ASSISTANT, EXTENDED FOOD AND NUTRITION EDUCATION PROGRAM [EFNEP], FORT BERTHOLD RESERVATION

My name is Elsie Danks. I am a resident of the Mandaree community of the Fort Berthold Reservation. My husband, Jim, and I have five grown sons. My husband and I were married in 1947 and lived in Elbowoods until 1954 when the reservoir waters came. I remember when the water came over the last bank and started filling the lower places in the town. Even though we saw them tearing down buildings and moving things out, I don't think that we had any notion of what we would suffer in the years to come. Mostly, I think we could't or didn't want to believe the extent of the changes in our lives.

We went from one organized community where we had the comfort and support of our families in one area to five scattered segments, where now, contact with family members is often only occasional. We left the river bottom where there was fine soil for farming and gardening and good water for any purpose, to the upper plains. In the Mandaree and Twin Buttes areas, from the very beginning of relocation, the people struggled with really bad water and even worse soil, until within the last ten years when water from the lake was piped in. Of course, the soil hasn't changed--it's most gumbo and only the most dedicated gardeners, who can drive to good patches of garden soil,can raise gardens now.

In the days of living on the river bottom, there were gardens. Not just community gardens, but entire families worked together to provide fresh garden produce for themselves and to share with others. We must remember that the Three Affiliated Tribes were gardeners, long before any immigrants came to their Nation. Many of the vegetables that everyone enjoys today were staple foods for the Three Tribes, and they have shared their seeds with the world.

Within walking distance of most homes was an abundance of food sources--wild fruit, including juneberries, plums, chokecherries, strawberries, raspberries, grapes, herbs, etc--that grew and produced so well on the river bottom. Deer, rabbits, grouse, and pheasants were near at hand, as well as fresh fish from the Missouri River and its tributaries.

Many people owned cattle and horses that browsed through the winter on the sweet clover and young willows along the riverbanks and were herded during the summer on the same upper plains where we are living today.

There were no commodity foods, as they were not necessary. Wheat, grown in the area was ground into flour at the mill in Elbowoods. Nearly all food purchases were staples, such as sugar, coffee, salt, etc. Canned tomatoes and sardines were a treat. I know some of you have heard or read all of these things many times before; however, we must accept the fact that we've had a drastic change in family lifestyle, and as badly as we would like to go back to where we were in those days, we can't.

I don't think there is hunger, per se, but, rather, poor nutrition. This is evident in the rise in many nutrition related diseases. In the survey I did for this testimony, the concerns expressed were related to too much fat, salt and carbohydrates in commodity foods. They feel that they would appreciate whatever changes can be made with adding fruits, vegetables and meats, with possibly fresh items in season. Since USDA donations are their main source of food, they are concerned that the health problems they are experiencing may be compounded in their children if something is not done to make some changes.

The best way, I feel, to address the problem is though cooperating in providing more education opportunities to our population. Dolores Sand, Mary Edith Good Bear and I work for the North Dakota State Extension Service as Program Assistants in the Emergency Food and Nutrition Program on Fort Berthold. We have served our separate communities for as long as 18 years. We each have contacted an average of 35 or more different individual homemakers each year, regularly on a monthly basis. We, also, have group meetings with different people. Although I don't have the statistics at hand, I'm sure we have contacted hundreds over the years. We have done what we can in teaching the people about food and nutrition. However, I feel we are not able to provide adequate education, working as we do, on a part-time basis. Further, unless the educational material is relevant to the needs of the people, they are useless, regardless of how much or little time we have to teach.

The Hot Lunch staff at the Mandaree School does an excellent job of introducing the students to a variety of foods and meeting their nutritional needs during the school term. However, very little nutrition education is provided as classroom study.

One suggestion I would have in getting Nutrition education to the people would be to provide Resource and Teaching Centers at each of the Segments and the Commodity Distribution Center. I don't think that centralization of such centers,say in New Town, would serve all the people's needs because of great distances to the center from the outlying districts. Some classes could be Food Preparation, Care and Nutrition for Infants and Children, Special Diet Food Preparation. These are just a few that would be useful and are needed.

Unemployment, alcoholism, poor health and the displacement from their natural home are the biggest heartaches for everyone living on the Fort Berthold Reservation. Hopefully, through approaching these problems locally, we can help relieve, if not cure, these troubles.

Thank you for your attention and for inviting me to testify.

PREPARED STATEMENT OF JAMES D. BROSSEAU, M.D., INTERNIST, GRAND FORKS CLINIC, GRAND FORKS, ND

During the first 40 years of this century, several American Indian tribes were screened for diabetes. Virtually no cases were found. Medical researchers felt that Indians were somehow resistant to diabetes. However, by the 1940's a few cases began to appear. Over the next three decades, diabetes proceeded to become first a common affliction of Native Americans, and then a problem of epidemic proportions. By the early 1970's, diabetes was being diagnosed in 50% of the adult population of the Pima Tribe of Arizona, and many other tribes were reporting rates of 20% or more. By way of comparison, the rate of diabetes among adult non-Indians in the 1970's was about 5%.

What caused this epidemic, and how can its rapid spread be explained?

Diabetes is the most common metabolic disease in the Western world. About 13 million Americans have it. It is caused by an absolute or a relative deficiency of insulin. Persons with an absolute insulin deficiency are classified as Type I diabetics. These persons have completely lost the ability to produce insulin and unless they receive it in the form of a daily injection, they will die. This is the type of diabetes which most commonly afflicts children and adolescents. The availability of insulin over the past 65 years has changed Type I diabetes from a rapidly fatal, acute type of illness into a chronic one. Nowadays people with Type I diabetes are most likely to die of the chronic complications of diabetes--strokes, heart attacks, and kidney failure--but only after they have had the disease for several decades. In the interim they are subject to disability from loss of vision, nerve damage, and amputation of limbs, as well as the job and social discrimination that come with diabetes.

People with Type II diabetes have a relative deficiency of insulin. Their bodies produce some insulin, but not enough to meet the body's needs. Many of these people have no symptoms of diabetes, and thus may live with high blood sugars for years before the disease is diagnosed. Type II diabetics can often have their blood sugar controlled simply by following a proper diet and controlling their weight. However, about one-third require an oral medication in addition to diet, and another one-third will require insulin shots. About 90% of Type II diabetics are overweight, and it is obesity which is felt to be a prime factor in the cause of their disease. Nearly all Indian diabetics have the Type II variety. Like Type I diabetics, Type II diabetics are highly prone to vascular, renal, and eye complications.

An important fact about Type II diabetes is that nearly half of all existing cases remain undiagnosed. Thus, for every person known to have Type II diabetes, there is another one, prone to the same complications, who does not even know that he/she has the disease. Ironically, Type II diabetes is often not found until the complications of the disease have become manifest.

Most researchers today believe that Native Americans are genetically more susceptible to diabetes than non-Indians. This genetic tendency was probably beneficial in ancient times when food was less available because it promoted the storage of energy. Paradoxically, when food was more readily available, this same genetic trait became detrimental because it led to obesity. The obesity, in turn, led to the development of diabetes. Whereas obesity was once rare among Indians, today it is extremely common. So too is diabetes.

The magnitude of the problem of diabetes among Indians is further illustrated by statistics released by the Indian Health Service (IHS) for the period 1981-1984. The diabetes mortality rate for all U.S. races during that period was 9.6 per 100,000. For the IHS population it was 25.5. For Indians living in the Dakotas, the death rate was 51.3, the highest in the nation. Among persons receiving outpatient care at IHS facilities in the Dakotas, 21% between the ages of 45 and 64 were diabetic, while 27% of those over 65 years of age were diabetic. These rates are 4 times the national average.

Diabetes is a complex, multifaceted problem. In human terms it is a devastating disease, both emotionally and physically. Economically, it requires tremendous expenditures of time and resources to care for the acute and chronic problems of persons with diabetes and its complications.

Early diagnosis and intervention to prevent diabetes or at least control its complications is the best way to curb this epidemic. This will come only through continued surveillance for the disease, continued research into its causes, and an intensified search for better treatment.

In the past, infectious diseases such as smallpox and tuberculosis caused the decimation and near-annihilation of the native population of America. Today these diseases are historical curiosities. The main health problems of American Indians today are chronic ones, and diabetes is the prototype of chronic disease. It is the goal of modern medicine to make this killer and crippler another historical curiosity.

[From Diabetes Forecast, Nov.-Dec. 1984]

A QUIET EPIDEMIC

Diabetes is taking a greater toll on American Indians than on any other group in the United States.

BY JAMES D. BROSSEAU, M.D., BONNIE R. BATA, R.N., F.P.N., AN

Call her Mrs. Winter. She is 74 years old, a Sioux Indian who has lived her whole life on the Rosebud Reservation in South Dakota. Despite intense pressures for change, she has continued to speak the Lakota language and to live according to the tradition of her ancestors. But there is one aspect of her life that is very nontraditional. Mrs. Winter has diabetes, a disease unknown to her ancestors.

"When I was a child," she says, "there was no one with high blood sugar. Now, it seems that half our people have it."

Mrs. Winter is correct. Within her lifetime—as recently as the 1930s—diabetes was rare among Native Americans.

But, by the 1960s, it had reached epidemic proportions: Of the estimated one million American Indians alive today, approximately one in three is at risk of developing diabetes, whereas in the general population, the risk is much lower (about one person in 20). Almost all of these cases are type II (non-insulin-dependent) diabetes. Type I (insulin-dependent) diabetes is still extremely rare among Indians.

Unlike the terrible measles and smallpox epidemics of the 1800s that wiped out whole Indian villages almost overnight, diabetes (which is *not* contagious) crept into the Indian population quietly. Its spread was slow compared to contagious epidemics, veiled by the often undramatic onset of the disease and the cultural silence of the Indians themselves. Moreover, the Indians were not accustomed to seeking help, particularly for a medical problem that can allow a person to "get by" without immediate treatment, often for years.

AND KATHLEEN MARQUART, P.A.

Health officials became aware of the extent of the diabetes problem among American Indians only around 1960, when costs from diabetes-related hospital stays became a major expense for the Indian Health Service (IHS), the branch of the U.S. Public Health Service that handles Indian health problems.

How and why has diabetes become such a major health problem for Indians, and what can be done to help? Researchers are trying to find out, and so far, their work on the first question boils down to this: The genetic makeup of many Indians seems to mix poorly with modern lifestyles and diets.

FINDING 'THRIFTY GENES'

This area of research had its beginnings in the 1960s, when a geneticist, James V. Neel, Ph.D., proposed the "thrifty gene" theory. Dr. Neel suggested that food in Native

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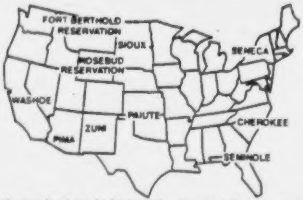
Miccosukee Indians (like the woman above), cousins to the Seminole, also face increased risk of type II diabetes.



Nearly one in three Indians, belonging to tribes throughout the United States, will develop type II diabetes.

American communities was at times abundant, at times scarce. Survival depended on the ability to get through periods of famine. For people living under such conditions, the ability to rapidly store fat during times of plenty is a major advantage. During modern times, however, food has become continually abundant, with the result that people with "thrifty genes" readily become obese. This, in turn, increases their risk for diabetes. In other words, a genetic makeup that suited Indians well for centuries may be proving harmful in the 20th century.

Current research tends to support Dr. Neel's concepts. The best evidence comes from the Pima Indians in Arizona. Nearly 50 percent of the Pima population has diabetes—the highest rate ever reported. Studies show that about half of all Pimas between the ages of 20 and 54 are obese—often, they are as much as half again as heavy as their ideal body weights. Unfortunately, even Pima children are showing the same tendency for obesity, with its increased risk for diabetes. Many other American Indian tribes are like the Pima in their tendency for diabetes. These include such widely scattered groups as the Washoe, Paiute, Zuni, North Carolina Cherokee, Seminole, and Seneca. Further evidence that this tendency is genetic comes from our own work among the Three Affiliated Tribes (the Mandan, Arickara, and Hidatsa) at Fort Berthold, North Dakota. Studies there suggest that the incidence of diabetes decreases as the Indians mix with other races.

Evidence from these studies adds support to the belief that type II diabetes has a major hereditary component among all Americans, not just Native Americans. Unfortunately, the factors (including specific genes) that make a person prone to obesity or diabetes, or both, have not yet been sufficiently identified to permit researchers to predict in advance which individuals will develop diabetes.

In addition to contributing to scientists' understanding of the causes of diabetes, work among American Indians is also aiding in the development of new treatment approaches. Much of this work is being done in five model diabetes care projects established in 1979 by the Indian Health Service Diabetes Program. These projects, located on or near reservations in Arizona, Nebraska, New Mexico, North Dakota, and Oklahoma, serve as examples of different ways of providing diabetes care that the IHS hopes will be adopted in other areas—with both Indians and non-Indians. A key element of the IHS projects is the health care team, typically consisting of a physician; nurse, nurse practitioner, or physician's assistant; dietitian; and diabetes educator—many of whom are Native Americans themselves. The teams offer medical care, nutritional guidance and education in ways that are individualized for the tribes they serve.

Because the model programs are located in differing environments among peoples with differing needs, they vary in emphasis. For example, the Fort Totten (North Dakota) reservation program emphasizes home visits and teaching on a one-to-one basis with the 250 people there who have diabetes. The Winnebago (Nebraska) program, which has a larger diabetic population (approximately 435 to date, with an additional 55 new cases each year), stresses community involvement. A popular part of the Winnebago program is a diabetes kitchen, where nutritional information is taught using foods from the local diet.

Extensive pregnancy follow-up routines are stressed at the Albuquerque (New Mexico), Claremore (Oklahoma), and Sacaton (Arizona) sites. The Sacaton program, serving approximately 900 Pimas with diabetes, emphasizes exercise, particularly among obese adolescents, who are at high risk for developing diabetes. And the number of IHS model sites is growing, thanks to an increase in federal funding. Two new sites will be selected in 1985.

Although it is still too early to offer sound statistics, officials at the IHS say they can already see an improvement in diabetes care among the Indians. In the Oklahoma area alone, they cite lower blood-sugar levels and better control throughout the population. Likening the agency's diabetes prevention programs to the vaccination programs of the past decades, a representative of the IHS notes that many people complained about spending money to vac-

continued on page 62

A Sioux Indian woman has her blood pressure checked during a diabetes care workshop at the Rosebud Reservation.

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EPIDEMIC continued from page 40

cinate when those programs began. "But today," the official points out, "there is no polio or smallpox."

AND THE WORD IS SPREADING

The IHS programs are called "models" because they are meant to influence the design of projects elsewhere. That spinoff has already begun. In the Aberdeen (South Dakota) Region, for example, 14 new diabetes care teams have been fashioned after those at the model sites.

The Rosebud Reservation, where Mrs. Winter lives, is another example of how the IHS approaches have succeeded elsewhere. Rosebud, home to about 7,500 people, has had problems with health care in general, and diabetes care in particular. Taking some cues from IHS research, and some from discussions with Rosebud residents, health professionals and tribal members have created the Community Health Representative (CHR) Program as a way of overcoming cultural barriers that were preventing existing services from being used. CHRs are tribal members whose job is to visit the homes of all community members and try to identify any health problems that may need medical attention. Once the initial contact has been made, the CHRs may return to the home and explain, in the native language, the treatments or diet requirements for a given condition, or they may even help directly in care. Because the CHRs belong to the tribe, they understand how to convince a person to get medical attention.

And Rosebud has developed other ways to reach the people. For instance, a two-day workshop on diabetes drew more than 100 residents. Though few of the people attending asked questions publicly, nearly everyone returned four months later for a follow-up session.

Mrs. Winter was one of those attending the workshop. She sat in the back of the room with another old woman. She asked no questions and made no comments. And yet she was there from start to finish. Mrs. Winter exemplifies the Indians of her generation. She needs the benefits of modern medical attention, yet cultural restraints may prevent her from getting it. Native CHRs and local seminars may provide a means for proper care of her diabetes.

And such programs are only the beginning. Researchers continue to seek explanations of why diabetes is so common among Indians and what can be done to halt its advance. In addition, health professionals continue their efforts to make such findings available to, and usable by, the people who need them. Together, researchers, government officials, health professionals, and Native Americans themselves, can stop this quiet epidemic before it spreads further. ▲

James D. Brosseau, M.D., specializes in diabetes, epidemiology, and internal medicine at the Grand Forks Clinic, in North Dakota. Bonnie R. Baia, R.N., F.P.N., is a diabetes educator at the clinic, and is also a clinical instructor in the Department of Community Medicine at the University of North Dakota. Kathleen Marquart, P.A., is a Native American working on the Rosebud Reservation.

[From Diabetes Care, Nov.-Dec. 1986]

Diabetes in American Indians: A Growing Problem

D. M. GOHDES, MD

Non-insulin-dependent diabetes mellitus is a major health problem in American Indian communities. Indian Health Service (IHS) collects information about outpatient visits and hospitalizations and analyzes mortality in American Indians and native Alaskans. Between October 1, 1982, and September 30, 1983 (fiscal year 1983), diabetes was the second leading clinical impression for all outpatient visits of patients 15 yr and older. Discharge diagnoses confirm both microvascular and macrovascular complications. Seventy-six percent of all IHS hospitalizations during fiscal year 1983 for lower-extremity amputation also coded diabetes. In 1982, the age-adjusted diabetes death rate per 100,000 was 19.9 for American Indians and native Alaskans, compared with 9.6 for all races in the United States. DIABETES CARE 1986, 9:609–13

Non-insulin-dependent diabetes mellitus (NIDDM) has become a significant health problem in American Indian communities. Extensive studies have focused on the Pima Indians of southern Arizona.[1] The World Health Organization (WHO) included both Pima Indians and a cohort of American Indians from Oklahoma in its worldwide study.[2] There are isolated reports from individual tribes, but limited data are available for most tribes on the prevalence and complications of diabetes. As a result of various treaties, American Indians and native Alaskans have received medical attention from the United States Government. Since 1955, the Indian Health Service (IHS), part of the United States Public Health Service, has been providing comprehensive care. Although some American Indians use alternate resources for health care, most use IHS for care. Thus, morbidity among American Indians can be estimated by examining the patient care data collected by IHS. We examined IHS data and compared it to other data sources to describe the extent and growth of diabetes morbidity and mortality in American Indians.

METHODS

The IHS operated 51 hospitals and many other health facilities in 28 states directly or under contract to tribes or Alaskan corporations during the time of this study. Facilities were grouped into area or program offices that follow geographical and reservation boundaries. Figure 1 shows the area and program offices where information is collected and tabulated by fiscal year. Providers listed reasons for outpatient visits at the time the patient was seen. Most areas used an ambulatory care reporting form that allowed two choices among categories of diagnoses and descriptions of care, e.g., immunization or physical examination. Alaska, Billings, and Tucson facilities used a computerized system with more flexibility. During fiscal year 1983, providers from these areas listed 1.4 reasons or clinical impressions per visit on the average. These impressions were based on the provider's best judgement at the time of the clinic visit with whatever laboratory support that might have been immediately available. The data were submitted to area and program offices and tabulated. Facilities in California, New York, Rhode Island, and Maine did not use the central data system during fiscal year 1983.

Indian patients can be admitted directly to IHS hospitals, or they can be referred to non-IHS facilities in nearby communities. IHS facilities vary in their resources for obstetrics, surgery, and intensive care. IHS contract funds are used to buy services when IHS cannot provide such services. Because these funds are limited, alternate resources such as Medicare, Medicaid, insurance, or veterans benefits are used for hospitalizations whenever possible. Patients who receive outpatient services at IHS facilities may be covered under alternate resources when hospitalized. IHS hospitalization data include only IHS inpatient services and those purchased with IHS funds, thus giving a limited picture of the hospitaliza-

TABLE 1
Diabetes outpatient clinical impressions by age* IHS and National Ambulatory and Medical Care Survey†

Age (yr)	No. diabetes impressions	Diabetes clinical impressions (%)	IHS rank order	National Ambulatory Medical Care Survey rank order
<25	3752	2		
25–44	33,045	21	6	20
45–64	79,914	51	1	2
≥65	39,218	25	2	2
Unknown	284	1		

*October 1, 1982 to November 30, 1983.
†See ref. 3.

tions experienced by American Indians. The data system records ≤6 diagnoses on direct discharges and ≤5 diagnoses on contract discharges.

Diabetes mortality data about Indians are derived from vital records and made available to IHS from the National Center for Health Statistics (NCHS). Their analysis identifies diabetes as a primary cause of death. Further analysis is carried out by IHS. Population estimates for Indian communities are derived from census data and projected yearly by IHS. Population estimates available December 31, 1984, were used in this study.

RESULTS

Outpatient data. Diabetes was the second leading clinical impression for outpatient visits to IHS facilities in patients aged ≥15 yr from October 1, 1982, to September 30, 1983. Providers marked diabetes as a clinical impression 154,888 times during this period. This represents 6% of the outpatient clinical impressions for patients ≥15 yr old when specific reasons for the visit were listed.

Table 1 shows the number of diabetes clinical impressions by age and compares these patterns with data from the National Ambulatory Medical Care Survey (NAMCS).[3] Type I diabetes is rare in American Indians.[4] The outpatient data are consistent with epidemiologic studies that show the paucity of type I diabetes in American Indian children. Only 2% of diabetes outpatient impressions occurred in those <25 yr. However, 55% of the Indian population is <25 yr. In the 25- to 44-yr age group, diabetes ranked 6th among the leading clinical impressions in IHS, whereas it ranked 20th among visits to general and family practitioners in the United States. In the groups >45 yr, the rank order was similar in IHS and the NAMCS.

The number of outpatient visits for diabetes has been steadily increasing from 58,901 in 1971 to 156,213 in 1983. The percentage of outpatient impressions related to diabetes can be separated by area and program office. Figure 2 shows the percentage of outpatient visits for all ages in which diabetes was listed as a clinical impression. The average for all areas was 4.8%, with a low of 0.9% in Alaska and a high of 9.5% in Tucson.

Hospitalizations. Table 2 compares diabetes discharges from short-stay hospitals in the United States with IHS direct and contract discharges that again show the relative paucity of diabetes in Indians <15 yr.[5] The most striking difference between IHS and short-stay hospitals occurred in the 45- to 64-yr-old group. Figure 3 shows the percentage of total dis-

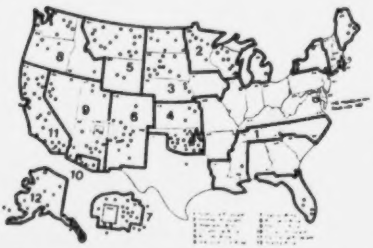

FIG. 1. Facility locations in Indian Health Service areas.

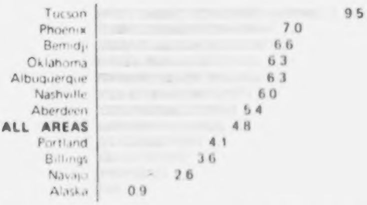

FIG. 2. Percentage of outpatient visits with diabetes as clinical impression from October 1, 1982, to September 30, 1983.

TABLE 2
Percentage of discharges listing diabetes as first diagnosis by age

	Age (yr)			
	<15	15–44	45–64	≥65
IHS (direct and contract)†	0.37	1.09	6.10	4.14
U.S. short-stay hospitals, 1982‡	0.60	1.02	2.77	2.24
P value	<.01§	<.1	<.01	<.01

*Diabetes, ICD-9 250.0–250.9.
†October 1, 1982, to September 30, 1983.
‡Utilization of short-stay hospitals, U.S. 1982.
§χ^2-Method.

charges in different IHS areas in which diabetes was listed as the first diagnosis. The IHS hospitalization figures underestimate the morbidity because these data do not reflect hospitalizations in non-IHS facilities funded entirely by alternate resources such as Medicaid. In general, the hospital data show the same trends as the outpatient visits, with Alaska low and Tucson high.

Indian patients experience both microvascular and macrovascular complications that require hospitalization. Table 3 shows the percentage of lower-extremity amputations in patients with a diagnosis of diabetes. In all areas, 76% of the lower-extremity amputations performed in IHS or contract facilities between October 1982 and September 1983 occurred in patients who had a diagnosis of diabetes. Comparative data from six states showed 45% of the lower-extremity amputations were related to diabetes.[6] More than one-third of the discharges for chronic renal failure also coded diabetes between October 1982 and September 1983. Diabetes was present in 29% of hospitalizations for ischemic heart disease. Table 3 shows variations by area. Despite limitations of the data, it is clear that American Indians with diabetes are being hospitalized for complications related to diabetes.

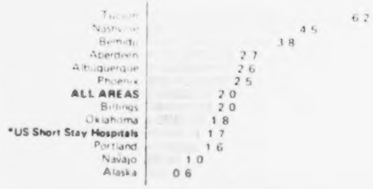

FIG. 3. Diabetes discharges, Diabetes, ICD-9 250.0; October 1, 1982, to September 30, 1983: 1st listed discharge/total hospital discharges. Asterisk, figures taken from report on utilization of short-stay hospitals (see ref. 5).

Mortality data. Indian mortality data were collected for the 28 reservation states (Fig. 4). Age-adjusted death rates for recent years for Indians living in these states are shown in Table 4. As a group, American Indians and native Alaskans experience twice the mortality rate from diabetes compared with all races in the United States. Age-specific death rates show that native Americans age 55–64 yr experience three times the mortality rate of all races in the United States in the same age group (Table 5). Rates for each age group >24 yr are given in Table 5. Crude death rates by area and program office are shown in Fig. 5. The area death rates, like the outpatient visits, vary across the United States.

TABLE 3
Diabetes-related complications: amputations, ischemic heart disease, chronic renal failure*

IHS area	Amputations	Total amputations related to diabetes (%)	Renal failure discharges	Renal failure discharges coding diabetes (%)	Ischemic heart disease discharges	Ischemic heart disease discharges coding diabetes (%)
Phoenix	137	88	216	54	194	47
Oklahoma	63	96	124	50	669	28
Portland	7	86	13	15	159	15
Billings	12	75	83	39	273	22
Albuquerque	4	75	96	40	65	42
Bemidji	5	60	14	36	175	32
Navajo	48	60	325	18	247	27
Aberdeen	25	56	240	35	578	32
Tucson	2	50	35	54	9	44
Nashville	8	38	35	60	61	22
Alaska	14	29	21	10	120	12
All areas	325	76	1202	37	2550	29

*October 1, 1982 to September 30, 1983.
ICD codes: lower-extremity amputations, ICD-9 84.11–84.17; diabetes, ICD-9 250.0–250.9; chronic renal failure, ICD-9 585–586; ischemic heart disease, ICD-9 410–414.

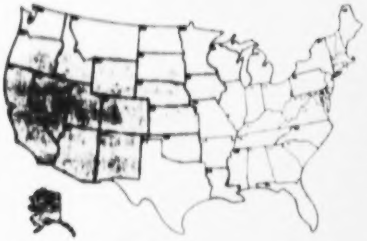

FIG. 4. Twenty-eight reservation states.

TABLE 5

Age-specific diabetes death rates (per 100,000) for American Indians and native Alaskans vs. all races in U.S.†

Age (yr)	Indians and native Alaskans* 1980–1982	All races in U.S.† 1981
25–34	2.6	1.4
35–44	5.7	3.5
45–54	26.7	9.6
55–64	83.0	25.6
65–74	132.0	61.9
75–84	189.2	122.7
>85	125.9	211.2

*Reservation states, 1980–1982.

†Monthly vital statistics report from the National Center for Health Statistics. Vol. 33, No. 3 (Suppl.), June 22, 1984.

DISCUSSION

Examination of IHS patient care data reveals that diabetes has become a significant problem in many Indian communities. Although studies have focused on specific groups, the problem appears to be widespread and growing. Theoretically, American Indians carry a "thrifty" gene that has enabled them to survive alternating periods of feast and famine. Changes in life-style experienced in Indian communities in recent years have led to increasing obesity, unmasking the genetic tendency to diabetes associated with the "thrifty" gene.[7,8] A rising prevalence of diabetes accompanied by an increasing tendency toward obesity in young people has been measured directly in Pima Indians between 1967 and 1977.[9] The number of outpatient visits to IHS facilities reflects the increasing number of patients. IHS work-load figures also indicate the relative paucity of diabetes in children. Figure 6 shows data from prevalence surveys, along with outpatient and mortality indicators. Although the survey studies used differing criteria for diabetes, data derived from actual population samples are available for the Alaska area, the Navajo area, and the Papago tribe served by the Tucson office. For other areas, data are not available or are incomplete for the tribes served. Diabetes was rare in Athabascans and Eskimos in Alaska when villages were screened.[10,11] The prevalence of diabetes in Papago Indians served by the Tucson program was similar to that of the Pimas, whereas the prevalence among Navajos was intermediate.[1] These same overall trends are present in the outpatient data and the mortality rates. Thus, area death rates and outpatient visits probably reflect the underlying prevalence of diabetes among other tribes.

As evident from the hospitalization data, amputations and other complications related to diabetes affect American Indians. In the WHO study, 9.2% of Oklahoma Indians had Q-waves present on the ECG compared with 2.4% of the Pima Indians.[12] Amputations were performed in 4.7% of the Pima Indians but in only 1.6% of the Oklahoma Indians.[12] Although some observations in the 1960s suggested that American Indians were spared complications from diabetes, IHS data and studies in specific tribes controlling for the duration of diabetes make this conclusion untenable.[13,14] The patterns of complications may vary in different groups. Formal epidemiologic investigation into these patterns may reveal important information about diabetes-related complications and their etiology. Finally, the mortality from diabetes

TABLE 4

Diabetes death rates for 28 reservation states*

Yr	Death rate of Indians and native Alaskans	No. of deaths	Death rate of all races in U.S.†
1980	22.6	204	10.1
1981	20.9	191	9.8
1982	19.9	193	9.6

*Age-adjusted per 100,000 population.

†Monthly vital statistics reports from the National Center for Health Statistics. Vol. 32, No. 4, August 11, 1983; Vol. 33, No. 3, June 22, 1984; Vol. 33, No. 9, December 20, 1984.

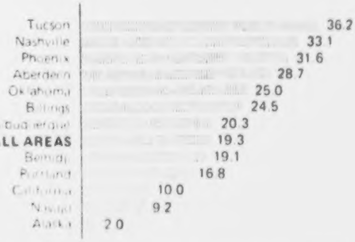

FIG. 5. Diabetes death rates 1980–82 (crude rates per 100,000).

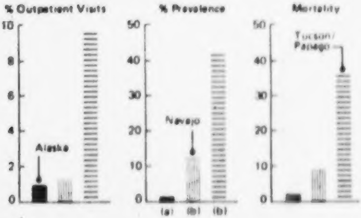

FIG. 6. Prevalence of diabetes compared with other indicators: (a) G. J. Mouratoff et al., 1973 (ref. 10), and G. J. Mouratoff et al., 1969 (ref. 11); (b) P. H. Bennett et al., 1976 (ref. 1).

in American Indian communities exceeds that for all races in the United States. The excess mortality is particularly striking in the 45- to 64-yr age range. Clearly, American Indian communities are faced with a serious growing health problem.

ACKNOWLEDGMENTS I am grateful to Anthony D'Angelo and the staff of IHS Program Statistics as well as Steven Kaufman in hospitalizations, Aaron Handler in mortality, and Thomas Berry in population for technical assistance. I appreciate the advice of Dr. Richard F. Hamman, Dan Gashler, and Dr. Maurice Sievers.

The opinions expressed in this paper are mine and do not necessarily reflect the views of the IHS.

From the Diabetes Program, Indian Health Service, Albuquerque, New Mexico.

Address reprint requests to Dr. Dorothy Gohdes, Diabetes Program, Indian Health Service, 2401 12th Street N.W., Room 211N, Albuquerque, NM 87102.

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PREPARED STATEMENT OF GRETCHEN CHESLEY LANG, DEPARTMENT OF ANTHROPOLOGY, UNIVERSITY OF NORTH DAKOTA, GRAND FORKS, ND

My name is Gretchen Lang. I am a medical anthropologist on the faculty of the University of North Dakota. Since 1981, I have been looking at community perspectives on health and health care issues in the Devil's Lake Sioux community in eastern North Dakota.[1] In particular, I have examined community and patient views regarding food, diabetes and diabetes treatments. This project has involved interviews and interaction with diabetics and their families, the Diabetes Program located in the Ft. Totten Public Health Service Clinic, the Office of Tribal Health and the Tribal Health Committee and numerous people in the community,[2] all of whom are concerned with the increasing prevalence of diabetes and obesity. This increase at Devil's Lake reflects the larger trend among many North American Indian populations, and more broadly, non-Western populations in diverse parts of the world; diabetes, along with hypertension & coronary disease, is frequently referred to as a "disease of modernization" in which major lifestyle changes have occurred including a more sedentary activity pattern. As for other Native Americans, diabetes is a"new" illness for the Dakota. An elderly woman recalls that he father was the "first person to come down with diabetes, in the late 1940's.) At times, diabetes is described as the latest affliction in the long chronicle of other diseases, such as smallpox, measles, influenza and tuberculosis. Ironically, diabetes, which is not contagious, has arrived with " modern" ways of living: too many calories, less activity, significant changes in diet--habits that affect all industrial populations as well as the smaller societies they incorporate.

In 1985, at Devil's Lake (whose population totals approximately 3000), the Diabetes Program identified 24% of the population 35 years or older (163/657) as having (type II) diabetes or impaired glucose tolerance, which was likely an underestimation. Younger adults as well have increasingly developed type II diabetes. An informal survey carried out by the Diabetes Program in 1981 documented a high rate of obesity among general clinic patients, and a higher rate for diabetes patients; an earlier study at Standing Rock Reservation by Bass and Wakefield (1970) demonstrated inadequate nutrient intake of key dietary components along with obesity.

Food preferences and contemporary dietary patterns at Devil's Lake reflect both cultural-historical factors (major subsistence shift during the past century and more of reservation life) and situational factors (rural poverty). Several hundred years ago the Dakota subsistence pattern in the woodlands region (Minnesota) centered around hunting, fishing, collecting wild plants, and the minimal cultivation of corn, beans and squash. Later, as the Dakota moved west onto the Plains, they adapted their diet to prairie resources with buffalo hunting as a central focus. At present, only a few older people collect and prepare the food and some medicinal plants that were once abundant in the wooded hills and open prairies of this region. Today, when available, foods such as prairie turnips, chokecherries, plums, wild onions and the domesticate "Indian" corn are held in high esteem, and have significant symbolic meanings for ceremonial and other social occasions; for the vast majority of people, however, they are not major components of the diet.

At present, the basic staple at Devil's Lake is the potato (as it was during the reservation period that began in 1867); for those households that have gardens (approx. 10%), potatoes and corn are the primary food plants, followed by onions, squash, occasionally turnips and carrots -- foods that can be dried or stored in cellars for the winter. Commodity foods are used by an estimated 85% of households.

allotted on a per capita basis, and provide canned meats, canned vegetables and canned fruits packed in syrup, macaroni, rice, flour, sugar, salt, shortening, and peanut butter among other foodstuff. In many households, fry bread, pan bread, oven-baked bread and rolls, fried potatoes, bacon, eggs, rich soups and stews (preferably beef) sweet rolls, cakes, donuts and cookies are frequent components of large family meals, along with canned vegetables and fruits. The food groups that are underrepresented in diets are usually green leafy vegetables and fresh fruits. While meat and additional food items are purchased at several small local stores or in Devil's Lake 13 miles to the north, commodities form the basis of household diets. Diabetics often stressed the difficulty of following lower-calorie diets (a challenge for all diabetics) which they described as including unfamiliar, disliked or expensive foods.

It should be emphasized that many of the introduced foods during the frontier times and in the form of government rations in the 19th century, have been incorporated into Dakota or "Indian" recipes, including of course fry bread, beef or buffalo stews, soups and puddings that frequently combine some traditional (way back) ingredients with high calorie additions. These "Indian" foods are interwoven (as with all cuisines) into on-going family and social life, and carry cultural meanings. Foodways are important indicators of ethnic/cultural affiliation, and are also adaptable and are modified over time. I have presented this brief historical context to suggest that the Dakota diet reflects both traditional Dakota culture and the history of the reservation period -- from the early years of government rations to the present strong reliance upon commodity foods.

Situational factors such as having no transportation, a harsh climate, little money for additional foods to supplement commodities, the challenges of following a diet while making meals to feed a large family may all mitigate against attempts to follow dietary regimens and/or to lose weight. Alcohol-related problems are undoubtedly a complicating factor at all levels. Devil's Lake, as many other Native American communities, has a high rate of unemployment and despite exceptions, in general may be characterized as a community with poverty. Based upon my experience at Devil's Lake and comparable communities that I have visited, three general recommendations are put forward, with the obvious recognition, that even the best intentions cannot easily override the large economic reality of a community as a whole.

1. The need for dieticians specifically to work with diabetics and others who would benefit from dietary counselling, in addition to (WIC) dieticians assigned to maternal and child health and nutrition. Devil's Lake is unusually fortunate in that they have the Diabetes Program staff to care for those who have diabetes, and to work with tribal committees to promote community awareness of diabetes and the potential hazards of obesity. A dietician who is sensitive to both cultural and situational factors at the grassroots level and who has time to communicate effectively (and, ideally, to make home visits) is a crucial resource in diabetes treatment and prevention. Diabetes programs tailored to the specific requirements and orientation of a given community would be a valuable addition to health care in Native American communities and neighborhoods.

2. The need for community involvement in preventative health efforts is obvious. There are mechanisms in place: Tribal Health Offices are key parts of existing tribal structures, and the Tribal Health Committee is made up of community members with an interest in over-all health issues in the community. At Devil's Lake there has been a growing cooperative efforts between the tribal government and the clinic in promoting preventative health. This is the logical intersection at which health issues can be addressed and innovative efforts be made for particular areas of concern, as for diabetes.

For example, medical and nursing schools are developing "cross-cultural" or "transcultural" dimensions in their curricula for training health workers. Likewise, Native American tribal and spiritual leaders increasingly participate in cooperative efforts involving traditional values and traditional concepts of well-being and health. It is at the specific local level that such training and motivation can be applied, and it may often be through trial and error that meaningful application can be attained. The recognition that two cultural traditions--that of a particular Native American or other ethnic group and that of biomedicine--are involved is an important step in developing the cooperative effort that will be successful.

3. Modification of commodity food program is suggested so that the range of food items include some of dietary items that often are missing in a situation of limited financial resources. Though commodity foods were not intended to provide a complete and balanced diet, nor intended as the basis for a diabetic diet, the actual use of these foods as major components of household eaating suggests the need to carefully assess such factors as the amount of salt, fat, calories, and other basic nutrients and additives in these food products for the well-being of those who rely primarily upon commodities. Native Americans as other commodity food users are aware of the increasing interest in such information in the U.S. and the increasing availability of such food items in regular supermarkets that have lower salt or no salt, etc. Commodity food users should be offered foods that contribute to their nutrition and health.

I would like to sincerely thank the members of the House Select Committee on Hunger for this opportunity to present the above material, and to thank all the people at Devil's Lake and elsewhere who contributed their time and ideas regarding diabetes and foods.

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[1] see G. C. Lang. 1985. Diabetics and Health Care in a Sioux Community. Human Organization 44(3):251-260.

[2] Beginning in late 1979, the Ft. Totten Public Health Service Clinic has been one site of the National Indian Health Service Model Diabetes Project, headed by Dr. Dorothy Gohdes, M.D., Indian Health Service Hospital, Albuquerque, New Mexico. A visiting endocrinologist physician works with the registered nurse, dietician, and project secretary to conduct screening programs, develop educational materials that are appropriate to this community, and individually work with patients and their families.

[Article From Plainswoman, Dec. 1982]

"Sugar" is new to Indian people

by Gretchen Lang

On a clear -15 degree morning last January, I drove the 105 miles from Grand Forks to the Devils Lake Sioux Reservation at Fort Totten, North Dakota, to talk with a Dakota woman about food, diet, and the way she manages diabetes. This interview marked the beginning of visits to 35 families with diabetic members, and was the culmination of several months' discussion and planning with the Tribal Health Committee and the Diabetes Program at the Indian Health Service Clinic.

Dakota Sioux are experiencing a dramatic increase in the number of people who have diabetes, as are other North American Indian populations. More than 30 percent of people on the Devils Lake Sioux Reservation over 30 years of age have maturity-onset diabetes, and this may be an under-estimation. Though dietary and medical regimens are straightforward and intended to alleviate symptoms and possible complications, all diabetics, Indian and non-Indian, know the difficulties of staying on carefully regulated diets and of avoiding too many calories. Dietary patterns and food preferences, shaped by social, economic, and cultural factors, may conflict with prescribed diabetic diets. My objective for family visits is to gain an understanding of diabetes management from the point of view of both homemakers and diabetics so that I can in turn assist health-care givers in clinical settings.

COOKING FOR TWELVE

I sat in the sunny living room of the woman's home, struck by the many photographs of children and grandchildren that filled bookcase shelves and one wall. Three grandchildren, covered with one of the beautiful star quilts for which Dakota women are renowned, were napping comfortably in an adjacent room as we talked. Another brightly colored quilt and some crocheted pillows were on the sofa. Our conversation ranged far from diets and foods, as this woman, now in her sixties, told me about growing up at Fort Totten. Yet the conversation soon turned full circle to diet and food.

She was born in 1918, the second in a family of 8, and lived with her parents and grandmother in a log house not far from her present modern one. As she grew into her teens, she became responsible for helping with younger brothers and sisters, and remembers the Great Depression of the 1930s as very hard for the family: long cold winters eating potatoes every day and only occasional treats of bacon and beef roast. Her father and older brother hunted, but they were a large family to feed. Jobs were scarce. Her father often could find only seasonal work as hired hand in summer and fall on a large farm south of the reservation.

The family had no car, and going to the store at Fort Totten meant a 6-mile walk no matter what the weather. When she was 14 her mother died, and she and her grandmother raised the brothers and sisters. She married when she was 17, and subsequent years were equally difficult, for during the next 14 years she had seven children and worked hard in her own small house feeding and caring for them. Her husband, often out of work, turned more and more to alcohol, and died in a car accident when the last child was an infant. Though her children are grown now, this woman still is at the center of activities in their growing families. Two are divorced and their children, in their early teens, live with her part of the time. She also cares for the young children of two daughters who work. She spoke to me at some length of her worries about those children who had moved to distant parts of the country, and of changes she sees in each generation. She showed me beadwork she was making: a medallion for the youngest son's powwow regalia and earrings for a niece's dancing costume.

Though she feels that she is getting good medical attention for

Diabetes

Diabetes mellitus is a metabolic disorder that occurs in two major forms: Type I or juvenile-onset, and Type II or maturity-onset. Type II acounts for 90 percent of diabetes cases in the U.S. Close to 5 percent of the U.S. population may have diabetes, and it appears to be increasing.

In Type I, juvenile-onset, pancreas cells that produce insulin are impaired so that insulin must be taken to control glucose levels in the blood. In Type II, maturity-onset, the pancreas may produce insulin, but does not properly control blood sugar levels (a mechanism that still is only incompletely understood). In Type II diabetes blood sugar levels often can be controlled by diet alone, or may require oral medication or even insulin in addition to a controlled diet. It is the maturity-onset form that is increasing among American Indians. Because medical research has found that diabetes and obesity are related, one of the ways to alleviate symptoms and prevent complications is to control proportions of carbohydrates, fats, and proteins in one's diet.

Fifty years ago, diabetes was virtually non-existent among North American Indians, yet now it occurs at 5-10 times the rate of the general population, and is especially high among Pima, Washoe, Northern Paiute, Zuni, Seneca, Seminole, North Carolina Cherokee, Mandan, Arikara, and Hidatsa groups. More recently, the Dakota Sioux have experienced a rise in diabetes 5 times that of the general U.S. population.

Medical personnel, tribal leaders, and researchers are concerned about this high percentage. Some attribute it to three factors: 1) a change from an active to a sedentary life; 2) change from diets high in fiber and unrefined carbohydrates to diets high in refined carbohydrates and sugar and low in fiber; 3) stress due to social and cultural change. These populations tend to have high rates of obesity, but just why some groups are more predisposed to this association between diabetes and obesity still is not clear.

In 1979 Fort Totten, on the Devils Lake Sioux Reservation, was chosen as one of five sites in a national Indian Health Service project for diabetes evaluation and treatment. A visiting physician consultant, a registered nurse, a dietician and a project secretary work together to conduct screening programs, develop educational materials that incorporate traditional foods in diets, and emphasize weight control and in some cases weight reduction.

diabetes, she is discouraged about controlling her diet. Large-quantity cooking makes it hard to stay on a special diet, and she serves a main meal to 12 or more family members almost every day. She thinks that her own tendency to over-weight may result from stress, and points out that "many Indian people like to eat a lot of bread and potatoes. They remember hard times and like a meal that makes them feel full." About diabetic diets she says "Some foods in these diets are ones many of us do not like: asparagus, broccoli, lettuce and so much salad, green vegetables. These are expensive too, and people don't buy them when they go to the store." Similar remarks were made to me also by other people trying to control their weight.

"HAVING SUGAR" COMES FROM EATING WHITE MAN'S FOOD

This woman, like others, refers to diabetes as "having sugar." She spoke of "sugar" as something "new to Indian people," that she felt was related to foods people eat. Others I talked with were more blunt, and connected diabetes directly to "white man's food," increasingly a part of their diet since before the reservation period. Though the woman I was visiting does not herself collect and prepare traditional foods, she feels these are "better for people than the sugar and all the canned foods people eat now."

Diabetes has taken Indian people by surprise, but experiencing a new health problem fits into a long chronicle of earlier severe and often fatal "new" diseases, such as smallpox, measles, and tuberculosis. Ironically, diabetes, which is not contagious, has arrived with "modern" ways of living: too many calories, less activity, significant changes in diet, habits that affect all industrial populations as well as the smaller societies they incorporate.

The Dakota, who once lived in woodlands and along river systems of Minnesota, have a history of change and adaptation to new geographical and social environments. Several hundred years ago, they hunted and fished, grew corn and collected wild rice. In the 19th century, wars with the Chippewa and the encroachment of European settlers preceded their move into the eastern Plains, where they hunted buffalo. The first residents of the Devils Lake Sioux Reservation, settled there by treaty in 1867, primarily were Santee Sioux and Cuthead bands of the Yanktonai Sioux. In his book The History of the Santee Sioux, Roy Meyer drew upon early reports of government agents sent back to the U.S. Commission of Indian Affairs to portray those years at Fort Totten. They were marked by starvation and near-starvation, and often poorly-administered attempts to introduce unfamiliar forms of "modern agriculture." The next century saw fluctuations in the introduction of various farming techniques and equipment, land-tenure arrangements, and policies to supply rations, but, as older people now remember those times, the constant theme was an ever present threat of food shortage—summers when the weather was bad and gardens failed, and people were faced with the on-going difficulty of making ends meet even in good years.

Government rations were distributed from the first years of reservation formation. Included were flour, saltpork, some meat (sometimes "on the hoof" but more often low grade beef and pork not always fresh), salt, sugar, tea and coffee. Agents decided how to distribute rations, and who should receive them and how much, so that allotments varied according to an individual agent's estimation of conditions and needs. In The Modern Sioux, Ethel Nurge describes traditional and contemporary Dakota foods, emphasizing the expansion of family gardens, the on-going collection of prairie plant foods, dependence upon hunting and the continuing reliance upon government rations in shaping dietary patterns of Sioux today.

FIRST BRAID YOUR TURNIP

Nurge lists the berries, leaves and roots used for food and for medicinal purposes on the Rosebud Reservation. Older women with whom I spoke at Fort Totten were familiar with most of these plants, but said that in some cases they knew of their uses only from their mothers and grandmothers. Although fewer traditional plants are used now, some continue to be key ingredients in dishes that are called "Indian" foods. Thus prairie turnips (teep se nah, or tipsin) are dried and braided into chains and later simmered in stews and soups. Wild onions (psin), similar to scallions and very mild with a slight garlic flavor, are used in a variety of boiled dishes. Other foods include wild artichokes (panghai); chokecherries (cham pah, pounded seeds and all with lard and sugar and formed into small balls; buffalo berries that once grew in great abundance in areas now cultivated or used for grazing; and red plums (cauntah). Wild rice, although uncommon in North Dakota lakes, is brought by friends and relatives from fall wild-ricing in Minnesota.

Older people say that not many know where to find these plants or how to prepare them, but those who do are often asked to make traditional dishes for special dinners and community functions. In many households drying food, (including making beef jerky and pemmican) is more common than canning.

HOW TO MAKE INDIAN CORN

Corn continues to be an important staple, grown in family and in larger tribal gardens, and harvested in late summer while kernels are still soft. An elderly woman described to me how that was done. She prepares a winter-long supply from the garden carefully tended by her husband by boiling the corn on the cob for half an hour, stripping the kernels and drying them in the sun with screens to protect them from flies. She uses the resulting crinkly yellow kernels in stews and for hominy. This is what is called "Indian corn" as distinguished from sweet corn, field corn, and multicolored decorative ears sometimes also called Indian corn. She also saves enough kernels for planting next year's crop, something the "industrial" farmer no longer can do with hybrid varieties.

Over time, Indian people, like non-Indians, have eaten progressively less home-grown food, native plants, and game, and more store-bought food or government rations. Nevertheless, potatoes and onions continue to be grown in sufficient quantities to last the winter, as well as such familiar garden vegetables as beans, peas, carrots, squash, cucumbers and tomatoes. While most families I visited have gardens of their own, especially if they live in the countryside near Fort Totten, St. Michael or Tokio, they also shop in grocery stores for meats, vegetables, fruits, prepared mixes and dairy products. Government rations have not disappeared; most reservation families have incomes low enough to qualify them for government commodities. Today there is wider variety among commodity foods than in the past: several canned fruits (often packed in heavy syrup), canned vegetables and meats, rice, macaroni, dried potatoes, flour, sugar, dried milk, cooking oil and lard. As in the past, commodities are limited to canned or dried products, and are not intended to provide all elements of a balanced diet.

Recipes for "Indian" foods incorporate native plants and game, especially venison, and they reflect the long period of reservation life. Stews call for white rice or potatoes, prairie turnips, onions, meat and stock, a substantial dish that varies according to available ingredients. There are many recipes for "fry bread," a favorite in Indian communities across North America, but basic ingredients do not vary: white flour, salt, sugar, baking powder, and lard or shortening for frying. Fry bread is a hallmark of contemporary American Indian public festivals, and often served in homes. The popularity of such rich foods as stews and fry bread, as well as the expense of store-bought fresh vegetables, fruits, and other items, make it hard to stick to a diet. Dakota women worry about diabetes, hypertension, and weight control as they, like other homemakers, become more aware of the way diet affects health. They worry too about too many soft drinks, candy, and other sweets.

"WORRY MAKES MY SUGAR GO UP"

I talked with a woman in her fifties who told me about traditional Dakota remedies for fever, headache, and indigestion. In her view, diabetes falls in a separate category. "People didn't use to have sugar in the old days," she said. "I was frightened when I was told I had sugar because I didn't know what it was. Now my mother has it and two of my brothers. I am worried about my children. I am not sure that there are specific traditional remedies for this because it is a new problem for Indian people. One thing that I know myself is that worry makes my sugar go up." She tries to be careful about her caloric intake, and has been successful in controlling her weight, although she admits that too many social occasions are hard on a diet. For a long time she did not know that other people had diabetes and she did not draw attention to her dietary restrictions, but now that she knows friends and relatives also are trying to eat smaller portions, it is easier for her to decline second helpings without feeling ungracious.

"LONG AGO PEOPLE DIED OF OLD AGE"

Another woman I spoke with remembers the great family gardens of her childhood. She was born in 1900 in a log house between Fort Totten and the mission at St. Michael's. She recalls helping her grandmother to raise, harvest, and preserve vegetables and meat. They had a big cellar under the house to store potatoes, onions, and collected foods. She also remembers that ration foods were not always fresh: flour with weevils, and semi-spoiled meats. What the non-Indian homemaker may perceive as "fresh food" in the supermarket does not necessarily meet her standards of fresh meat and vegetables, especially the high estimation she holds for freshly-killed game. She thinks that canned and packaged foods are unhealthy. "Long ago people died from old age, not from these diseases that we hear so much about now, cancer, diabetes, heart disease." While she feels that these traditional foods and methods of preparation were better, she acknowledges that it would be difficult to return to large-scale use of naturally harvested foods.

In her own lifetime, this woman told me, she experienced many aspects of off-reservation society. In her late teens she worked for eleven years in Chicago at a variety of jobs: as cleaning lady for a family on the North Shore, waitress, and shirt-presser in a large laundry. She then married a Lakota Sioux man from South Dakota and returned with him to the reservation to raise two children. Although her health was never good, she did not develop diabetes until her early sixties. She spoke to me of the strong ties in Dakota families where generations are closely intertwined, grandmothers and great-grandmothers caring for youngsters, and sisters and cousins assisting one another to care for elderly members. For her, and many other Dakota women, food is one significant aspect of cultural heritage, and she hopes her grandchildren will know and appreciate them as she hopes they will speak the Dakota language and share in on-going Dakota society.

WAY-BACK FOODS MAKE CULTURAL BRIDGES

Foods are important to the transmission of culture. People make the distinction between "way back" time and the more recent historical period. "Way back" refers to the time before European expansion, reservation settlement, and the rapid social change that led many to poverty and unemployment. They realize that the period after reservation settlement helped produce a diet high in calories and fats that was not typical of the earlier times. Today many younger people are rediscovering elements of the way-back time that include learning about the uses of traditional foods and medicine. Cultural continuities are complex and the transmission of culture takes place on many levels. One seeming contradiction is that some popular "Indian" foods today are not the same as way-back traditional foods. When confronted with diabetic diets, people are rethinking dietary patterns and the role of historical factors in these patterns.

Using traditional food is not just nostalgia. Mealtimes are times for extended families, often three and four generations, to gather. Community events such as pow wows, meetings, marriages, and funerals involve sharing dishes with a wider network of relatives and friends. Dinners honoring visiting distant relatives and acquaintances from reservations in Montana or South Dakota or reserves in Canada symbolize these wider connections. Dakota life is very much in the present, and foods, as in all societies, are an integral part of social life.

The respect for "way back" traditional foods and the awareness of the healthful properties of such foods resembles the similar trend in the larger American society to improve and simplify diet, to exercise more, and to avoid excessive calories and additives. The Dakota, like other American Indian groups, have a great resource in their food traditions and customs that can serve as a stepping stone to this larger effort to manage diet and health.

NOTE: Persons assisting in this study include Francis Streifel, R.N., Jeannette Butts, R.D., and Marion Archambeault of the Diabetes Program on the Devils Lake Sioux Reservation, as well as Genevieve Goodhouse and Mary Quigley of the Tribal Health Committee; and Art Raymond, Bonnie Bata, R.N., F.P.N., Dorothy Lentz, and Peter Nabokov, of the University of North Dakota. Partial funding for this study was provided by the UND Faculty Research Committee.

Gretchen Lang teaches anthropology at the University of North Dakota.

[Article From High Plains Applied Anthropologist, Summer/Fall, 1986]

THIS ISSUE

Traditionality Amid Change in the U.S.: Anthropological Roles

Many social science scholars and practitioners contend that a priority professional concern should be with the plight of people who are victims of imposed changes over which they have little control, especially when these changes run counter to their sense of meanings and interests. The articles and commentary in this issue focus on the consequences of traditionality amid change in the United States, and what these challenges imply for anthropological practice.

Gretchen Chesley Lang gives attention to such issues in the case of Native American health in North and South Dakota. She notes various ways anthropologists' contributions should be helpful to Indian health practitioners and policy there, and thus promote constituents' welfare (although it often does not work this way). Darlene Thomas follows up with consideration of the depressing employment patterns and problems of Native Americans in several Western and Great Plains states, and reflects on anthropological role implications in the larger context of the nation and profession. Barbara Yee and Peter Van Arsdale then address adjustment problems of older Southeast Asian women who have been recent immigrants to the Western U.S. The dynamics of their coping with the dramatic changes which their families experience suggest additional avenues for ethical and effective professional practice. Each of these cases provide us with complementary insights on the application of anthropology in the service of U.S. subpopulations who, by virtue of traditions different from dominant American ones, suffer from changes not of their making and outside their sphere of control.

In commentary which follows, Howard Stein sorts and expands on central concerns of applied role performance in impressive synthetic fashion. These thoughts in part summarize and reflect various personal and small group discussions as well as formal comments at recent HPSfAA meetings, and serve to illustrate the insights that result from meeting participation. The commentary section also contains another installment of Susan Scott-Stevens' "Tales of Chaos," wherein she explores several aspects of anthropological practice in her most intriguing way.

Larry Van Horn's book review section this time contains Muriel Crespi's review of Cultural Conservation, edited by Jeffrey McNeely and David Pitt; Peter Van Arsdale's review of John van Willigen's Applied Anthropology; and George Fulford's review of Campbell Grant's Rock Art of the American Indian. Other content of the issue includes notes on the HPSfAA meetings last year and what is anticipated for this coming Spring, other association business notes, and some observations on the activities of our sister local practitioner organization in Southern California.

Articles

CONTEMPORARY NATIVE AMERICAN HEALTH ISSUES: HOW CAN ANTHROPOLOGISTS CONTRIBUTE?[1]

Gretchen Chesley Lang[2]
University of North Dakota

Introduction

The stated goal of the 1976 Indian Health Improvement Act (PL 94-437) was "the provision of the highest possible health status to Indian people while encouraging maximum Indian participation in health programs" (Rhoades, cited in Senate Hearings 98-353,1983:3). The volumes of testimony collected to justify reauthorization of this act during 1983 by the U.S. Senate Select Committee on Indian Affairs (1983, 1984) from tribal leaders, tribal health personnel, and directors of varied Indian health-related projects across the U.S. speak to on-going severe needs in all aspects of health care in both reservation and urban Indian communities. These spokespeople requested more funding and reinstatement of funding that has been cut, as well as policy changes at all levels.[3] This testimony was a highly personal and emotional complement to the often obscure governmental statistics regarding the status of Indian and Alaskan Native health.

The purpose of this paper is to discuss from an applied perspective some of the ways in which anthropologists carrying out health-related research in Indian communities may directly contribute to on-going efforts in these communities to improve health care. The anthropologist brings a holistic, comparative and culturally relativistic approach, and as an outsider, may have some perspectives and resources that can be shared with the various "sub-cultures" that are brought together in the complex arena of health care. At the outset, the assumption is being made that the majority of anthropologists working with Indian people on health-related issues would like their endeavors to benefit directly, or indirectly, these same people. In this paper, I will draw upon experience and studies in the Northern Plains region, specifically with respect to the Dakota and Lakota (Sioux).

During the past decade, mainstream health workers have become increasingly aware of the importance of understanding the social and cultural dimensions of communities in which they work. The curricula of medical and nursing programs are gradually incorporating a cross-cultural perspective in training their students. Likewise, Native American tribal and spiritual leaders are increasingly outspoken in their assertion of traditional values and concepts of well-being and health as they critique mainstream medical assumptions and practices. Situational factors such as poverty and unemployment on reservations and in cities, inadequacies in health care delivery, and the fact that the great majority of health workers—particularly in the higher echelons—are non-Indians, are realities that complicate the issues. Successful health programs need more than additional personnel and finances; they must be structured to include both tribal (community) and clinical participation. The Indian Self-Determination Act (PL 93-638) of 1975 has set the stage for more tribal involvement in community planning. Some reservation communities have started their own clinics or have allowed outside (non-Indian Health Service) clinics to provide health care. It will be increasingly important for Indian communities to assess and plan the "medical landscape" that seems most appropriate.

In a review of studies of health and healing in Plains Indian societies, Kemnitzer (1980) pointed out a lack of research regarding the present-day interaction of indigenous/traditional medical beliefs and practices with mainstream biomedicine. For example, he cites Bean and Wood's (1969:20) paper in which they observed that most studies of health-related topics regarding California Indians have examined the effects of European diseases on non-European populations, and the relationship of population density to ecological factors in native California. Here critical areas of current health needs of California Indian people have been neglected by researchers. Kemnitzer's (1980) bibliography on health research with Native Americans in the Plains region reflects a similar focus in the literature: studies that place, on the one hand, an emphasis upon traditional religion and medicine, roles of traditional healers, and some descriptions of present-day religious orientations, and, on the other hand, statistics compiled by the Indian Health Service (IHS) and Bureau of Indian Affairs (BIA) regarding health-related problems, often in mimeographed format.

During a study of diabetes, diet and foods (1982-1984) at Devil's Lake Sioux Reservation in eastern North Dakota, I became aware of several modest approaches that an anthropologist might take to directly contribute to existing health programs. My study involved diabetic patients and their families, the Tribal Health Office, the Tribal Health Committee, and the Diabetes Program in the IHS clinic. First, it became apparent that the anthropologist has access to library materials that are unfamiliar to most health care workers. Ironically, the few writings that directly bear upon current health beliefs and practices and examine community perspectives on health, illness and health care delivery are frequently overlooked by those who potentially could find them valuable to their specific task, or for the desire for an over-all understanding of the community in which they are working. Such materials may require "translation" or interpretation by the anthropologist to make them useful for the types of concerns that physicians, nurses, dietitians, and health planners may have. Second, the cultural/medical anthropologist may be able to work cooperatively with tribal health personnel or with tribal and clinic personnel, in efforts to assess community needs in health care, community attitudes about existing health care delivery and by assisting in proposal writing. I will illustrate these approaches with several examples below.

The Anthropologist as Library Resource Person

Publications written by anthropologists are often confined to journals or monographs that do not achieve high visibility to those working in health care professions. Many of these writings are not presented in a manner that would have practical application to those in the health fields; the concepts, language and organization of such works differ from the literature of the health professions. The types of materials that may be useful to those involved in planning and/or delivering health care include ethnographies of the community (or comparable communities), older compendia of traditional plants and foods, documents containing earlier surveys of health conditions, physical anthropological data, demographic features of the community and changes or trends through time, and dietary patterns and preferences. The following example will focus on sources of information that relate to the health patterns of one reservation community.

A number of anthropological studies touch upon or address aspects of medical beliefs and practices among the Lakota people of Rosebud Reservation in South Dakota. While these studies are useful to those working with other groups of Dakota and Lakota, they are especially valuable for health workers at Rosebud where the original studies were conducted. Health care at Rosebud is faced with severe problems, in part due to its remote location and high rate of poverty.[4]

Grobsmith's contemporary ethnography, Lakota of the Rosebud (1981), along with Albers' extensive work with the Eastern Dakota at Devil's Lake (1974), is one of the few contemporary social and cultural portrayals of the Sioux. Her integration of fieldwork and historical material on religious and, by extension, medical beliefs and practices for the communities on Rosebud Reservation, though not written for this purpose, could well serve as required reading by newcomers to the staff of the hospital and clinics.

An earlier study, based on fieldwork carried out by a nurse-anthropologist Virginia Ford in 1966 at the Rosebud Reservation, is available as an unpublished dissertation entitled "Cultural Criteria and Determinants for Acceptance of Modern Medical Theory and Practice among the Teton Dakota." Ford identified four major community orientations towards health and healing among Rosebud residents: the Yuwipi Way, the Peyote Way, the Herbal Medicine Way and the Modern Medicine Way of dealing with illness. Ford's commitment to this work was, ultimately, to assist a more effective delivery of appropriate mainstream medical care to meet the needs of the whole community, as well as to develop a model for looking at intracommunity variation in medical beliefs and practices. Although outdated in some aspects, her examination of sociocultural factors involved in individuals' selection of traditional and mainstream healing is an insightful resource for present-day health workers' understandings.

Nurge (1970) drew upon her fieldwork on the Rosebud Reservation, historical sources, and government statistics to document significant changes in Sioux diet and nutrition from pre-reservation days (prior to 1868) through the recent decades into the 1960's. She also examined the traditional and on-going role of foods in social and cultural life at Rosebud. This article remains the most comprehensive documentation of dietary change for any of the Northern Plains societies, and can serve as a take-off point for further attempts to examine the relationship between present-day foodways and such contemporary conditions as diabetes and obesity.

Two volumes (Rogers 1980) of Father Buechel's studies of native plants and their uses by Rosebud people are valuable contributions to understanding ethnobotany and the variety of native flora of the region used in the traditional diet. However, as other compendia of native plants and their roles in the pharmacopeia (such as Gilmore's classic documentation of plants used by Indian peoples of the Upper Missouri [1919]), there are difficulties in utilizing these materials for practical purposes. Dieticians and others attempting to develop educational dietary materials that bring in "traditional" or "Indian" recipes need more current understandings of available food items, popular recipes, and require knowledge of community foodways that today may center around a smaller repertoire of native plant foods (cf. Brown and Mussell, eds. 1984; Lang 1985). Most of the traditional dishes served today reflect the history of dietary modification and change in food preparation methods (Nurge 1970; Bass and Wakefield 1974; Toma and Curry 1980; Lang 1982, 1985). A continuing reliance on commodity foods by perhaps 85-90% of many reservation populations is a significant consideration in understanding dietary patterns and difficulties involved in following prescribed dietary regimens by patients with chronic conditions. These collections are valuable reminders of the plant and animal resources of the past, and can serve as a backdrop to present-day recipes that include traditional ingredients.

The studies conducted at Rosebud reflect different research objectives and styles. Ford and Grobsmith both address intra-community variation, the emic or "insider" rationales for medical choices and they portray the complexities of contemporary Lakota society and culture. Nurge and Rogers provide information for specialized topics in diet and nutrition. In addition, two studies carried out at Pine Ridge, west of Rosebud, should be noted. Powers and Powers' (1984) analysis of the symbolism of the Oglala (Lakota) food system and Kemnitzer's (1976) examination of the Yuwipi healing ritual present in-depth understandings of cultural meanings involved in foods and health.[5]

At an IHS diabetes training session for health workers at the Rosebud Hospital held in 1984, I found that of the approximately 50 health workers present (physicians, dieticians, LPN's, CHR's, RN's, and dentists), only three acknowledged their familiarity with Grobsmith's book, and no one was aware of the other studies. A number of individuals were interested in obtaining the references, and it is possible that these works will contribute to their specific projects and to a more general understanding of the community.

Taken together, these works contain important insights into Lakota culture, particularly what is meaningful to Lakota people. They provide insights into Lakota efforts to maintain health and to deal with illness. For non-Lakota health workers, these materials could be a stepping stone to working with Lakota health workers for culturally-appropriate efforts in areas such as dietary regimens, hospital care, and health education approaches. These writings provide a necessary counterpoint to survey statistics, where the main purpose is often to justify and/or document program-related expenditures. Ford and Grobsmith both emphasize individual differences while presenting major themes in Lakota culture, and both discuss the use of alternative healing strategies and the rationales that underly them.

Potential Anthropological Contributions to Tribal Health Programs

Anthropologists may be able to work directly with existing health projects in a number of ways. In the remainder of this paper, I will suggest some avenues for cooperative, community-based research that have become apparent from a project conducted at Devil's Lake Sioux Reservation in North Dakota on patient and community perspectives of diabetes and of the commonly-prescribed treatment regimens (Lang 1982, 1985). Though the etiology and characteristics of diabetes cannot be discussed here, it should be emphasized that during the past 45 years adult-onset, or Type II, diabetes mellitus has affected many Native American populations with prevalence rates 5 to 8 times higher than in the total population (West 1978).

The majority of Native Americans are users of mainstream medical care and, depending upon individual and tribal traditions, may rely upon additional or alternative practices to maintain health or cure/alleviate illness. Large-scale data compiled by the IHS have indicated areas of improvement in health status over the past two decades, notably a decrease in infant and maternal mortality and a general decline in infectious diseases (HEW 1978). The over-all profile of Native American health has undergone changes that resemble the larger society in that chronic conditions—diabetes, hypertension and heart disease, along with obesity—have emerged as significant health problems, in some cases disproportionately higher in prevalence than among the total U.S. population. The most critical example is diabetes and its association with obesity (HEW 1978).

Between 1981 and 1983, with the cooperation and assistance of the Tribal Health Committee, 20 families were located who were willing to discuss their ideas and perceptions of their condition with me. Although I would not assume that diabetes is the major concern of most families at Devil's Lake, diabetes as a new condition which affects Indian people is a worry to residents. At present, the prevalence of diabetes at Devil's Lake (based on the number of dingnosed diabetics/total number of adults over 35) is 24% of adults over 35 years of age (Diabetes Program, personal communication). As a condition with potentialy severe complications, diabetes requires day-to-day adherence to strict medication and dietary regimens that often conflict with existing food preferences, food preparation methods, meal scheduling and larger aspects of foodways. As I talked with the families and the often elderly diabetics, conversations turned invariably from diabetes and diabetic diets to foods, traditional food, then to history and politics as recalled or recounted to them by members of older generations.

Diabetics and their families were well-informed about the dietary requirements and had a clear understanding of their medical history (cross-checking with biomedical records showed 95% of patients had accurate figures for weight, height, type of medication, and ideal body weight as recommended by their physician or the dietician). As shown in other studies of compliance by diabetics (Eckerling and Kohrs 1984) compliance with medication schedules was more successful than compliance with dietary regimens. Furthermore, on the whole, patients did not feel that they were as overweight as suggested by health workers; people at Devil's Lake associate bigness with well-being and health. The majority of Devil's Lake patients said candidly that they did not use the diet education materials and that they did not try to follow the meal plans. Dietary preferences, social and symbolic aspects of foods as well as situational factors (such as expense, and the reliance on commodity foods as dietary components) mitigated against adherence. There was also a more obliquely-expressed but strongly-held conviction that diabetes was a product of "white man's foods", and was one more onslaught from the coming of Europeans. Older people spoke eloquently of an idealized past—in pre-reservation days—in which Dakota were endowed with health and strength.

In contrast, the general impression of non-Indian health workers about these patients was that: 1) they did not understand the instructions and explanations given at the clinic, thus there was a need for more educational materials, and 2) patients were not really concerned with their condition, as evidenced by lack of dietary and weight control measures. The Indian Health Service Clinic on the Devil's Lake Sioux Reservation is one site in a national Five-Sites Diabetes Project; the Diabetes Program Office is an unusual special resource for a reservation, and its health workers have attempted to design their health care to meet Dakota patient needs.[6] Individualized dietary plans have been designed to reflect food preferences, scheduling of patient visits is flexible, and home visits have been given a high priority. The nurse, consultant endocrinologist, dietician, and LPN have taken a comprehensive approach to each patient's whole health picture; the Diabetes Program is increasingly serving as an initial contact point by diabetic patients for non-diabetes related complaints.

The tribal concern and involvement with community health appears to be increasing. The present Tribal Health Director, a Dakota woman originally from the community and in charge of all tribal health programs, has taken on the role of patient advocate with respect to the clinic. She is interested in a more community-based approach to preventative medicine and an up-grading of health care delivery. With her leadership, there is the potential for a more active Tribal Health Committee on this reservation in the future.

Anthropologists carrying out research that involves aspects of health and illness that bears upon community health can contribute to the needs of the Tribal Health Office or the Tribal Health Committee (composed of community people) in a number of ways. These may include: 1) presenting preliminary findings or the conclusions of their study to the Tribal Health Committee; 2) providing a written summary of the background information used in their study (which is often basic, but requires time and effort to obtain). Such information can be a surprisingly valuable resource for grant proposals for continuation of on-going programs or for new health-related programs; 3) the sharing of recommendations for projects that can be carried out by the tribe itself or by cooperation of the tribe and the clinic personnel. Since community health issues are part of the "business" of both the Public Health Service Clinic and the Tribal Health Office, there should be great potential for cooperative efforts to address particular areas of concern: public awareness and education regarding current health problems, e.g., diabetes, heart disease, obesity, alcohol-related problems, nutrition and diet. The anthropologist—as an "outsider" in many instances—may be able to draw attention to areas where these two organizations might work together.

Conclusion

Anthropologists—both cultural and medical—with ethnographic skills and objectives related to health issues in Native American communities have choices to make in their research approach. Given the tenor of Native American communities regarding research, and given the objectives of the Indian Self-Determination Act, the most feasible position is to work with the Tribal Health Committee or its equivalent—in urban areas it may be a community health council—"to carry out research on matters of direct concern to them" (Borrero et al. 1982:130). This approach is a form of what has been called "action" anthropology (cf. Tax 1958:17; Clifton 1970:106) or "advocacy" anthropology (Schensul 1973; Schensul and Borrero 1982) and may involve the collection of data to support community-based objectives in cooperation with community people. At times, this may place the anthropologist in a position of possible opposition to existing institutions and procedures and may be perceived as a kind of grass-roots effort for change.

At present, perhaps a more relevant model for large-scale research with a community orientation is the Hispanic Health Council Project in Hartford, Connecticut, that involves anthropologists in data collection, training of community researchers, service and advocacy in a single program. This nationally-funded project was directed towards impacting on service systems through service to individual clients (Schensul and Borrero 1982). In the Hispanic Health Council Project, an integrated approach began with research data related to a high prevalence of one recognized condition, *otitis media* (middle ear infection) (Borrero et al. 1982:151). With community support, a major baseline survey was conducted that led to subsequent studies of birth control method preferences and ways in which people handled crisis events (for both physical and mental illness). In terms of long-term change the Council identified sectors of the mainstream health system that were sympathetic to their objectives (often to serve their own best interests) and has worked on cooperative projects with these sectors to tailor health care delivery to the needs and preferences of the Puerto Rican community.

Anthropologists are in a position to try to understand the workings of a community *along with* an important sector such as health care delivery, that for rural reservations generally means the Indian Health Service. Topper (1985) has cogently pointed out that anthropological research and research findings often go unnoticed or ignored by policymakers at higher levels. Topper (1985:2) states that it is not enough to understand the "general and non-accountable" relevance of the community medical belief system and expect that the health care system will respond to our efforts. He elaborates:

> So what is it that we must do to gain access? The answer is really quite simple, we must learn their system. We must view our colleagues in medicine and psychology as members of a cultural system, and we must study that system as we would study any other. We must become familiar with their beliefs and values, their myths and rituals, their language, their cultural knowledge, and their behavioral repertoires. And we must understand all of these in the context of the environment in which they exist (1985:2).

Alhough Topper is making points that are of crucial importance in the larger training and development of medical anthropologists, he reminds us that to make the existing (often overlooked) literature relevant, to highlight areas for improved health care delivery, to assist health care workers in developing culturally and situationally appropriate programs, anthropologists have to learn about the ways in which the mainstream medical system operates in the community. Therefore, the anthropologist interested in contributing to community-based programs involving health care of necessity must know the existing system and how to be a "translator" between the two.

For many of us, the words of the Sioux writer Vine Deloria's (1969) best-seller, *Custer Died For Your Sins*, still echo in our ears: anthropologists are a small sort of plague, seasonal (summers), and we best make ourselves absent. However, in Deloria's (1970) second book, *We Talk, You Listen*, there is the suggestion that anthropologists and others with various research/technical skills essentially be drawn upon to serve specific needs, or objectives, as communities define them. It is suggested here that anthropologists with a wide variety of expertise and research interests may be able to contribute—in small or large ways—to health issues as they are perceived and formulated at the community level. Whether the anthropologist is drawing upon valuable existing resources or adding to understandings of communities through additional work, the real challenge is in conveying the results—to both community-tribal structures and to those working in the mainsteam health care settings—in culturally appropriate ways.

NOTES

1. An abbreviated version of this paper was presented at the Annual Plains Anthropology Conference, 17-20 October, 1984, Lincoln, NE, as part of symposium entitled "Issues Concerning Contemporary Native People of the Plains."

2. Gretchen Chesley Lang, Ph.D., is with the Department of Anthropology, University of North Dakota, Grand Forks, ND 58202.

3. The bill for reauthorization of the Indian Health Care Amendments was vetoed by President Reagan on 19 October 1984 (National Indian Health Board (NIHB) Health Reporter 3(13-14)). Although IHS funding and services will continue, the "new initiatives" contained in the bill will be lost (NIHB 3(13-14):2-3, 1984). As a "protected program," the IHS will undergo budget cuts under Gramm-Rudman legislation (NIHB Health Reporter 4(2), 1986).

4. The Five Sites of the Diabetes Evaluation and Treatment Project of the IHS (U.S. Public Health Service) include the Claremore, Winnebago, Sakaton, Albuquerque and Ft. Totten (Devil's Lake) Service Units. These sites are located in areas where diabetes has become an increasing health problem among Native Americans, and where there was an existing IHS facility that served a significant proportion of that population. The project director is Dr. Dorothy Gohdes, MD, IHS Hospital, Albuquerque, NM.

5. Hagey (1984), a nurse anthropologist, has analyzed a collaborative effort between the Faculty of Nursing, University of Toronto, and Ojibway and Cree in Toronto, to understand and draw upon traditional meanings and metaphors surrounding illness, especially diabetes. This article demonstrates the possibilities for cooperative efforts in cross-cultural communication in which participants creatively integrate

medical belief systems for a common objective. Hagey, as well as Judkins (1978), has pointed out the subtle and complex factors involved in perceptions of cause of illness and of treatment strategies.

6. The Rosebud Reservation health care delivery system was highlighted in the NOVA television documentary "Crisis in Indian Health" (first aired in the spring, 1984). An article originally in the Washington Post vividly featured some of the difficulties faced by Rosebud residents as users of medical services (NIHB Health Reporter 3(13-14): 16-21, 1984).

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Diabetics and Health Care in a Sioux Community

by Gretchen Chesley Lang

Gretchen Chesley Lang is an Associate Professor, Department of Anthropology, University of North Dakota, Grand Forks, North Dakota 58202.

The research discussed here was carried out between 1982–1984 and was supported in part by a Faculty Research Grant, University of North Dakota. A shorter version of the present paper was presented at the Society for Applied Anthropology meetings in Toronto, 1984. The author wishes to thank the residents of the Devil's Lake Sioux Reservation, the Diabetes Program Staff at the Ft. Totten Indian Health Service Unit and the Five-Sites Diabetes Project Director Dorothy Gohdes, and members of the Tribal Health Committee and Tribal Health Planner Cindy Lindquist.

Native American populations are increasingly being confronted with higher prevalence rates of chronic conditions, sometimes referred to as "diseases of modernization," such as obesity, diabetes, hypertension, and coronary artery disease. Diabetes mellitus (Type II) has emerged during the past four decades as a major health concern. Compliance with diabetic therapeutic regimens is difficult for all diabetics (cf. Eckerling and Kohrs 1984). In Native American communities, it is important for non-Native American health workers to obtain an understanding of the social traditions and cultural meanings of behaviors that will be affected by therapeutic regimens. This paper examines perceptions of diabetes and prescribed therapeutic regimens by diabetics and their families in a Sioux community. Views on foods, diet, and the dietary change that has occurred over the past century and a half may help explain patients' acknowledged low compliance with diabetic diets. A distinction is made between "way back" foods and contemporary "Indian foods." Social and symbolic aspects of present-day foodways may be drawn upon by dieticians and health workers to promote awareness of the potential benefits of lower-calorie diets. The roles of a recent Diabetes Program at the Indian Health Service Clinic and of the Tribal Health Office are considered with respect to developing community-based health objectives.

Key words: diabetes, dietary change, Indian health

Diabetes is an increasing health problem for many Native Americans. This paper will examine diabetes and diabetes management on the Devil's Lake Sioux Reservation from the perspectives of the community, diabetics and their families, and a Diabetes Program of the Indian Health Service. It is suggested that for Sioux diabetics difficulties with prescribed treatments, dietary regimens in particular, stem from political and ideological factors as well as from economic and situational factors. The Sioux view the underlying cause of diabetes as another development in the major lifestyle changes that they have undergone, especially during the past century of reservation life.

In a recent review of research on health and healing among Native Americans of the Plains region, Kemnitzer (1980: 272) pointed out a lack of reported research on present-day health issues in their social and cultural context. In particular, he urged study of the relationship between indigenous medical systems and Western medicine and health care delivery.[1] Health educators are becoming increasingly aware of the importance of understanding the "medical belief systems" of their clients, and Native Americans are increasingly vocal in their assertion of traditional values and concepts of well-being and health as they critique Western medical assumptions and practices. Yet situational factors, including poverty and unemployment on reservations, inadequacies in Western health care delivery, and the fact that a great majority of health workers in the higher echelons are non-Indians, are realities that complicate the issues. Successful health programs will need to be structured to include both tribal and clinical participation if objectives of the Indian Self-Determination Act legislated in 1975 (P.L. 93-638) are to be realized in the area of health care and preventative medicine.

During the past several decades, diabetes mellitus Type II, also known as non-insulin dependent diabetes or maturity-onset diabetes, has emerged as a major health problem for many Native American populations from virtual non-existence 50 years ago (Eaton 1977; Knowler et al. 1983; West 1974, 1978). An examination of Indian and Native Alaskan health statistics for the past 25 years (1955–1979 for which summaries are available [cf. U.S. Department of Health, Education and Welfare 1978:1–2]) reveals significant improvements in certain areas, particularly in the area of communicable disease and maternal and infant mortality rates, but increasing prevalence of and mortality due to diabetes, hypertension, alcoholism, suicide and homicide. As a result of hearings in the mid-1970s of the National Commission on Diabetes, and in response to an increasing prevalence rate of diabetes to rates five to eight times the 5% U.S. all-races rate (Eaton 1977), a Model Diabetes Evaluation and Treatment Project with Five Sites was developed through the Indian Health Service (IHS) at Headquarters West, Albuquerque.[2] The present research was carried out at one of these sites on the Devil's Lake Sioux Reservation in eastern North Dakota, where the Ft. Totten IHS Clinic is located.

During the past two-and-a-half years I have been collecting information regarding health beliefs and practices, food beliefs and dietary preferences, with a particular interest in how they bear upon an understanding of diabetes and diabetes management by diabetics and their families. Furthermore, two objectives centered on health care for diabetes: 1) to examine the approach and role of the Diabetes Program in the context of the larger socioeconomic and cultural features of the reservation community, and 2) to address some of the ways in which such a program may meet some of its long-term objectives regarding diabetes prevention and management in this community. With the approval of the Tribal Health Committee and cooperation of the Diabetes Program, I have carried out home interviews and have made on-going home visits with a study group of 20 diabetics and their families. I have also interviewed and talked with a broad range of residents of the reservation, and have participated in various community events and celebrations. During this time I have had an opportunity to see the development and the growth of the Diabetes Program, and have likewise observed an increasing tribal awareness of diabetes as a major health concern. In spite of this recognition of diabetes as a health problem by tribal leaders and health care workers, I do not pretend that diabetes is the main concern of most people in their daily lives, however, it may be useful to look at the Diabetes Program as a case study in which larger health care issues as they relate to a patient population, the tribal structure, and to the clinic are brought together.

Diabetes and the Devil's Lake Sioux

The increasing prevalence of diabetes among the Sioux reflects a larger trend among many North American Indian populations, and more broadly, non-Western populations in diverse parts of the world. Indigenous populations in Oceania, Australia, Africa, and parts of Asia are increasingly seen to have high rates for diabetes (West 1974, 1978). In a cross-cultural study of diabetes prevalence rates, Eaton (1977) has attempted to demonstrate the relationship between this increase and several factors in the major lifestyle changes of modernization: 1) reduced energy expenditures of individuals whose lives have become more sedentary, and often urban; 2) the change from a diet high in fiber and unrefined carbohydrates to a diet high in refined carbohydrates and sugar and low in fiber; and 3) stress due to acculturation.

Though comprehensive epidemiological studies have not been conducted, it is estimated that more than 20% of Native American adults over the age of 35 on reservations in South and North Dakota have diabetes (Diabetes Program 1982; Brousseau et al. 1979), which may well be an underestimation. At the Devil's Lake Sioux Reservation, a crude prevalence rate based on the number of diabetics over 35 years of age (N = 163) with respect to the total population over 35 years (N = 657) shows 24% of the population as having diabetes or impaired glucose tolerance (Indian Health Service 1983).

From the viewpoint of health personnel, once diabetes is diagnosed the primary task is to regulate blood sugar levels. Standard prescribed regimens include, depending upon patient's condition: 1) strict dietary regulation, 2) dietary regulation along with oral medication, or 3) dietary regulation along with insulin. Obesity is very often associated with the onset of diabetes and, though the exact relationship between obesity and body insulin performance is unclear (Keen et al. 1979; West and Kalbfleisch 1971), it has been demonstrated that for the majority of newly-diagnosed cases of Type II diabetes, weight reduction may significantly reduce or alleviate symptoms and the possible complications (Maurer 1979). Thus patients are usually instructed to reduce their caloric intake, to exercise, to carefully schedule mealtimes and to measure correct proportions of carbohydrates, proteins and fats in their diets.

The Sioux have a high rate of obesity; an informal survey of 100 walk-in patients showed 60% of all clinic patients to be 20% or more overweight (based on ht./wgt., Metropolitan Life Insurance Tables 1980) and a survey of 100 diabetics showed 82% to be 20% or more overweight (Butts 1981).[1] The dietician estimated a high caloric intake and an accompanying low physical activity pattern for many of the older overweight diabetic individuals, ranging from 2,500–4,500 calories/day. To date, 24-hour recalls or observational-measurement dietary intakes have not been systematically carried out, nor may this procedure be feasible to do at the present time, except as a method for some individual dietary counseling by the dietician.

Of the 20 diabetics in the study population, nine were on insulin and dietary regimens, ten were on oral hypoglycemic agents and dietary regimens, and one was on a dietary regimen alone (this was representative of the distribution of the therapies for the larger diabetic population of 163). All diabetics were precise about their most recent blood sugar readings, current body weight, and medical histories (as cross-checked with their medical records), and indicated a regular schedule for taking prescribed medications. Yet the majority (17 out of 20) stated that they did not follow the dietary regimen, though they all indicated their knowledge of the basic "rules" they should follow in food selection and menu planning. Food preferences, expense, and lack of time in a large household were the most frequently given reasons for lack of compliance.

Diabetics and non-diabetics alike expressed their feelings about being overweight candidly—they "like to feel full," or "Indian people like to eat a lot," and relate this back to hard times in the past. People do not voice a concern about their body weight, though diabetics are more sensitive to the change from a formerly thinner population, recalling their parents and grandparents. Two patients who lost 20 or more pounds said that other family members discouraged any further weight loss, saying that the patients looked "sick." With one exception, diabetics (N = 19) were precise about their weight history, present weight and the number of pounds that they were advised to lose. Of these 19 patients, 12 indicated—despite recommendations to lose weight—that their current weight was "about right," while 7 patients indicated that they were trying to reduce. In general, Dakota people today associate bigness and heaviness with a sense of well-being and health.

As all dieticians and health workers know, compliance with such day-to-day (and often life-long) diabetic regimens is difficult for many patients (cf. Dracup and Meleis 1982; Eckerling and Kohrs 1984; Haynes et al. 1979; Sackett and Haynes 1976). Furthermore, compliance may be complicated by factors of poverty (Koss et al. 1969; Roth 1969; Suchman 1965) and by cultural factors when patients are of a different background from the mainstream medical care providers (Harwood 1981; Mechanic 1972; Snow 1974). Illness, as distinguished from disease, is strongly influenced by culture, and is part of a social system of shared meanings and rules for behavior (Kleinman et al. 1978:252). Thus, cultural orientation may influence the ways in which illness is presented, how care is evaluated by the patient, and how one cares for oneself (Foster and Anderson 1978:251; Kleinman et al. 1978:252).

The Devil's Lake Sioux

HISTORICAL BACKGROUND. Present-day residents of the Devil's Lake Sioux Reservation in east-central North Dakota are, in the main, descendants of the Eastern and Middle of the three major divisions of the Dakota or Sioux people (Feraca and Howard 1963; Howard 1960). Though elderly residents at Devil's Lake today do not recall specifics about their forebears' locations in the pre-reservation period, they voice clear and often idealized ideas of the lifestyle and well-being of their ancestors in the pre-reservation and pre-European past. The Middle Division of Yanktonais and Yankton peoples moved into the central Missouri River parklands by the seventeenth century, while the majority of the Eastern Dakota Division—the Santee—remained in Minnesota until the middle of the nineteenth century. The traditional subsistence patterns in the woodlands centered around hunting, fishing, collecting wild plants, and the minimal raising of corn, beans, and squash along the rivers and lakeshores of Minnesota (Pond 1860–1867; Skinner 1919:167; cf. Howard 1960 and Landes 1968 for summaries and additional information). By the late eighteenth century and first half of the nineteenth century, wars with the Ojibwa, white settlement (Eastman 1849) along with outbreaks of smallpox and cholera (Meyer 1967:69) and confinement to Indian territories within Minnesota contributed to extreme poverty and hardship. During these years the Eastern Dakota, including the Sisseton and Wahpeton bands of the Santee, continued to join up with the Yanktonais and other groups in the Dakotas for large summer buffalo hunts, but their over-all subsistence pattern remained the fall deer hunts, trapping, and the collection of plant foods, especially wild rice, maple syrup and the prairie turnip (Haberman 1978, Landes 1980). Holzkamm (1983:226) has recently argued that Eastern Dakota involvement in the fur trade made it possible for them to acquire horses and participate in the bison hunting economy of the Plains beginning as early as the seventeenth century and continuing into the nineteenth century. Utilization of the prairie resources farther to the west is carefully documented by Nurge's extensive (1970) article on the traditional and contemporary diet of the Sioux.

The Devil's Lake Sioux Reservation Treaty of 1867 incorporated members of the Cuthead bands of the Yanktonais, as well as Eastern Dakota Sisseton and Wahpeton band members. The Annual Reports from the reservation superintendents to the Commissioner of Indian Affairs (1867–1904) and other official reports (cf. Meyer 1967) portray conditions on the Devil's Lake Sioux Reservation in the years following 1867. These records document the effort to convert the Dakota to farming through the distribution of rations, seed, farming equipment (albeit often in poor repair or outmoded), and livestock. Meyer (1967:239) points out that attempts to encourage farming were relatively successful during the first 15 years, in part due to efforts of Indian Agents McLaughlin and Cramsie (Meyer 1967:234); but an inadequate supply of equipment, small annual government appropriations, and severe droughts and grasshopper invasions contributed to a downhill slide. The majority of residents in the 1890s found themselves almost completely dependent upon government rations consisting of green coffee, dried tea, sugar, flour, salt pork, and some handouts of beef.

The early decades of reservation life were more successful than what was to follow during the first half of the twentieth century. Fractionalization of individual allotments became an increasing complication in the use or lease of properties. Droughts and the general economic depression of the 1930s led to an increasing poverty including food shortages and continuing reliance on government rations. These conditions continued after WWII into the 1950s. It is of these decades that older persons speak most vividly today in the 1980s, the years in which they were young adults and starting to raise their families. They bitterly recall long walks in the coldest winters with concerns about no automobile transportation, whether or not food supplies (often the mainstay was potatoes) would last the winter, keeping abreast of the need for firewood and fresh water, and coping with increasing alcohol-related problems and diseases such as pneumonia, tuberculosis, and influenza.

THE RESERVATION COMMUNITY AT PRESENT. The Devil's Lake Sioux Tribe today has an enrollment of approximately 3,100 individuals, the majority of whom reside in the four-county region within the original reservation boundaries. Included in this figure are the approximately 15% of the tribal membership who currently live outside the community. According to Bureau of Indian Affairs figures, individual Indian and tribal holdings presently total 54,000 acres (32% of the original reservation acreage), though almost half of the usable acreage is leased to non-Indian ranchers and farmers. According to Meyer (1967:228), the original settlement pattern on the reservation was five or six main encampments; by the 1890s agents had encouraged a relocation to individual farming plots. Albers (1974:181) points out that kinship clusters were maintained and developed during this period and were the basis for a variety of social and ceremonial associations. During the past 30 years new government housing has replaced more than half of the log homes and small frame houses that were dispersed across the reservation. This shift of housing from a rural settlement pattern to concentrated areas of single and multiple-unit dwellings has been blamed by older residents as the cause of what they see as more social problems: trouble-making by young people, trampling of gardens, more noise, and more automobile traffic. One elderly spokeswoman sees the increase in diabetes along with these problems as a result of stress caused by crowding into new residential areas.

Present-day Dakota families are large, and households frequently include members of the extended family, representing three generations with perhaps two or more adults with several children each in the middle generation. Grandparents provide an extremely important role in the over-all economic and emotional support of these extended families, serving as a "home base" for babysitting, with long-term and sometimes permanent care of grandchildren. Older women are often in charge of cooking a large daily meal for household members and other relatives, and it is common for a major meal to be served to 10–12 people each day in many households. Individual and family networks of affinal, consanguineal and friendship ties extend beyond the reservation boundary, the original band, or tribal division. In an extensive ethnohistorical and ethnographic analysis of the structure and composition of the Devil's Lake Sioux community, Albers (1974) has described pre-reservation and contemporary social systems linking Dakota throughout all of the Plains region. Such alliances and flexible support systems are reinforced and renewed today through such mechanisms as giveaways held at powwows, naming ceremonies, memorials and other occasions such as the Sun Dance in which people travel to distant communities for often lengthy stays. During the summer many families frequently travel by car for visits and weekend powwow celebrations in these distant places. There are also special friendship bonds and fictive kin relationships that further reinforce sharing and support between individuals and kin groups. Numerous school, church, and other community functions draw people together at all times of the year. Food plays a central role in each level of interaction, and is one of the most important elements of hospitality at both the family and community level.

Today, most homes are equipped with modest, but modern appliances, including propane or electric stoves, indoor plumbing, refrigerators (and occasionally freezers), television sets and radios. Few homes have such conveniences as dishwashers or automatic washing machines and dryers. By standards of the larger American society, the majority of families at Devil's Lake reflect a pattern of rural poverty. In 1983, 62% of adults between ages 18–64 were unemployed (Bureau of Indian Affairs 1983), nearly one-third of those employed have an annual income of less than $5,000 (Grand Forks Herald, 4 March 1984). Here, I will simply indicate some of the small realities of daily life by mentioning factors such as unpredictable or no available transportation in a harsh climate, not having a telephone, numerous breakdowns in appliances such as electric pumps for wells, plumbing, and other items of technology that are expensive to have repaired, and long waits at government and tribal offices and often at the clinic. Tribal leaders and the Tribal Health Committee are especially concerned with recent cutbacks in government and tribal positions at all levels, a high prevalence of alcohol-related problems, and the challenge of maintaining and improving programs started during the late sixties and early seventies such as elderly housing, the nursing home, the halfway house, and a family counseling center.

Traditional Foods and Traditional Medicine

FOODS AND DIET. Among the Dakota today at Devil's Lake, a few older people collect and prepare the food plants that were once abundant in the wooded hills and open prairies in this region. Others indicate an interest and nostalgia in such "way back" (Lang 1982) foods, and try to obtain them from friends or relatives for special occasions. The items most frequently mentioned include prairie turnips (*tipsina*), chokecherries (*cham pah*), buffalo berries (*mastincha puté*), wild onion (*pshin*), June berries or Saskatoons (*wipazuka*), red plums (*caumah*), wild artichokes (*panghai*), wild rice (*psin*) brought over from Minnesota, meat prepared as pemmican, venison stew, and occasionally rabbit. Some families raise "Indian" corn (*wamnáheza*), parching the kernels for later use in soups and stews. Ethnobotanical reports and compendia of native foods and their uses show the broad range of usable plants that were used for food and in the pharmacopeia (Densmore 1928, Gilmore 1977, Nurge 1970, Rogers 1980, Vogel 1970). Today, older medicine men and some elderly women and men know these resources, but in general only a few of the above-listed items appear in "traditional" meals—these are the prairie turnip added to stews, corn soup, chokecherry balls, plum jam and berry soup. Buffalo and venison—or beefalo—are used in major stews for social occasions such as social dances, school programs, memorial ceremonies, naming ceremonies, or sponsored dinners put on by families for relatives and friends during visits or celebrations.

When asked about present-day foods and diet, people invariably turned the conversion to the traditional plants and wild game of the past, then to a commentary on "white man's foods" in contrast to these former foods, and then to history and politics as recalled and interpreted. The cause and increase of diabetes in particular is associated with this dietary change to "canned and store-bought" foods, and these modern foods are described as "slowly poisoning us," as "spoiled," and as unhealthful. These traditional foods were part of a lifestyle when "people lived to be 100 and weren't sick with the diseases we hear about now like cancer, heart disease and diabetes," one elderly woman said. This same idea was voiced by many others in conversations about diet.*

A distinction should be made between the wild plant and game foods that are viewed as traditional foods ("way back") and the foods that are identified as "Indian," such as fry bread or rich beef stews, and often served at "Indian" occasions. Whenever possible, these "Indian" dishes incorporate traditional ingredients, such as buffalo meat or prairie turnips used in stews, and can be seen as having an important role in social occasions that affirm community and "Indian" identity as well as serving as symbols of a non-European past.

Contemporary dietary preferences on the Devil's Lake Sioux Reservation, as those described by Nurge (1970) for the Rosebud Lakota, reflect the history of the reservation period and the years of government rations and, more recently, government commodity foods. The basic starch food is the potato, and if people have gardens, potatoes and corn are the primary food plants, followed by onions, squash, occasionally turnips and carrots—all foods that can be dried or stored in cellars for the winter. Commodity foods are used by an estimated 85%–90% of the households, allotted on a per capita basis (personal communication) and provide canned meats, vegetables, fruits packed in heavy syrup, macaroni, rice, vegetable shortening (substituted for lard), and flour, sugar, salt, and peanut butter. Fry bread, pan bread, and oven-baked bread and rolls, fried potatoes and bacon, eggs, rich soups and stews (preferably beef) and sweet rolls, cakes, donuts, and cookies are main components of large family meals along with canned vegetables and fruits.[5] The food groups that are underrepresented in diets are usually green leafy vegetables and fresh fruits. Diabetics stressed the difficulty of following lower-calorie diabetic diets which they described as including unfamiliar, disliked or expensive foods.

MEDICINE. Accounts of traditional Dakota religious beliefs and practices have primarily centered on the Teton Dakota (Western) groups, with emphasis upon the most dramatic of the seven sacred rituals, the Sun Dance (Grobsmith 1981, Hassrick 1964, Liberty 1980 [cf. review of Sun Dance scholarship], Powers 1975, Walker 1980, Wissler 1912). The Eastern Dakota share many of the basic assumptions and ideology that underlie the traditional religious system (Landes 1968, Lowie 1913, Lynd 1864, Skinner 1919), yet there is no comprehensive examination of Eastern Dakota religion in its social and cultural context. Lowie (1913), in a discussion of dance associations, suggests less formal organization and elaboration of practices among the Eastern Dakota at Sisseton and Devil's Lake Reservations than was found among Western Dakota societies. Historical impressions and descriptions of Eastern Dakota in Minnesota before the reservation period are likewise differentiated from the Teton High Plains cultural patterns.

The history of Christian missionization, the length of time and location on the Plains, and historical factors such as which bands were settled on particular reservations and the more recent presence or absence of ritual specialists in communities (there are no recognized medicine men at Devil's Lake today) are contributing factors in shaping individuals' participation in traditional religion. Grobsmith's (1981) description of the highly complex and diverse ways in which individuals and families are involved in both traditional and Christian religions at the Rosebud Reservation is applicable to the community at the Devil's Lake Reservation. At Devil's Lake, I have also found that people vary in their religious orientations: many people emphasize their Catholicism, yet are most knowledgeable about Dakota beliefs and practices; a few families are committed members of the Native American Church; some call themselves "traditionalists" and are actively engaged in pipe ceremonies and are called upon for singing at events such as memorial ceremonies which require knowledge that many do not possess today; some individuals are skeptical about the present-day medicine men's power as opposed to the past powers of the "holy men and women" (*wicasa wakan* and *winyan wakan*) and the medicine men and women (*pejuta wicasa* and *pejuta winyan*). These ritual specialists are distinguished partly by their healing methods (cf. Powers 1975), with the use of supernatural power versus the use of herbal medicines and a knowledge of specific medical techniques.

At present, a number of residents at the Devil's Lake Reservation travel long distances to Yuwipi healing ceremonies (cf. Kemnitzer 1976) farther west; a number of middle-aged men are currently involved in sweat lodge ritual and purification for vision-questing and participation in the Sun Dance held at sites in western South Dakota. Personal-social networks bring people at Devil's Lake into the larger Dakota society that exists throughout the Plains, and a main reason for travel is to participate in ceremonial and social occasions (Albers 1974).

With respect to health and healing, present-day ritual specialists, as those of the past, stress the unity of mind-body in an individual's well-being and state of health. Kemnitzer (1980) has generalized for Plains cultures that "disease [is] viewed as a consequence of breaking a spirit-imposed taboo." At Devil's Lake, older traditionalists say that disease may result along with other misfortune, as a result of not keeping "a promise" (e.g., neglecting to hold a memorial ceremony for one who is deceased after intending to do this, or to not follow obligations understood in a vision, such as taking up a spiritual calling). In a related sense, disease is seen to result from leading a "bad life," morally and spiritually. Sorcery does not appear to be perceived as a specific cause of illness, though older people enjoy recounting instances in which "powerful medicine" was used in gambling, romantic pursuits and sexual manipulation, and sometimes in causing a person to be susceptible to illness or failing in energy. The effects of such "bad medicine" must be reversed with the intervention of a ritual specialist.

People at Devil's Lake are worried about the increase in diabetes. Though understanding of diabetes as a disease defined by the Western medical profession varies from individual to individual, most people include Western descriptions and explanations in statements such as "diabetes runs in our family" or "diabetes started when I became overweight." On another level, there are perceptions that extend into broader realms—several areas of shared agreement are put forth here:

1) diabetes as a general phenomenon is an affliction that is affecting Dakota people because their whole lifestyle is out of balance, people are not "living right" anymore, the times are not good.
2) diabetes is the most recent instance of white man's destruction of Indian society and culture. After all the other introduced diseases (smallpox, influenza, measles, tuberculosis, alcoholism), "now there is diabetes."[8] The specific pathway is through foods, especially in their processing and packaging.
3) diabetes itself as a condition may not necessarily be treatable by traditional means because it is a new condition and there are no specific remedies for it. Also, there are few, if any, medicine men who have "power" that would be required to treat this condition. However, some people spoke of medicine men who have treated diabetes in a *Yuwipi* ceremony on other reservations during which time patients were advised to suspend Western diabetes medications and to follow prescribed dietary and purification regimens. Several people spoke of herbal preparations (liquid) available in Canada or Texas that would "cure diabetes" and allow them to follow unrestricted diets.

The powerful symbolic dimension of foods is well known. Foods are an important element of social identity; foods play significant roles in ceremonies such as in the "feeding of the dead" in the memorial ceremony held one year after a person's death; foods and all elements of the natural environment to the Dakota are of *Wakan Tanka*, "The Great Spirit." Foods, whether contemporary "Indian foods" or the traditional "way back" foods, are regarded even more highly now when wild plants and game are difficult to obtain. The traditional foods that are available, but in short supply, are limited almost exclusively for ceremonial and special social occasions.

Besides the high regard for traditional foods and medicinal plants, and the importance of the role of eating and food in marking social occasions, there is another dimension that emerges: the politics of foods and diets as prescribed by Western health care givers. Diabetes is perceived as another imposition on Indian people by Europeans or "whites," and dietary regimens are perceived as telling people how to live their lives. It appears that there is a political statement here reminiscent of Lurie's (1971) discussion of excessive alcohol use by many Native Americans as a "protest demonstration" and affirmation of Indian identity. While it may appear to be a contradiction that there is a reluctance to take up restricted dietary regimens that may eliminate some of the perceived hazards of modern-day foods, the diabetic diets (along with other dietary regimens prescribed) invade a most personal and socially important area—eating habits. At this point, health beliefs and their daily application in maintaining and taking care of oneself can be considered at another level. Low compliance with prescribed diets is not because of incompatible perspectives between one medical system and another regarding the desirability of attaining health, nor of an inability to change dietary patterns, but can be understood as a statement of recalled history and on-going Indian-white relations.

The Diabetes Program at the Fort Totten IHS Clinic

The Diabetes Program has worked towards identifying and treating individuals with diabetes and complications of diabetes. At present, 167 diabetics have been examined by the nurse, dietician, and either the visiting endocrinologist or a regular staff doctor. Though there are undoubtedly some individuals who may be developing diabetes or who do not know that they have the condition, this program has drawn attention to diabetes as a significant health problem in the community and has partly alleviated the mysterious feeling that people have about its increasing occurrence. As a result, more people have come for blood sugar readings or for information about diabetes and about weight reduction.

The Ft. Totten IHS Clinic has a patient population of approximately 2,800 people, the majority of whom live within the reservation boundaries. The clinic has had a large turnover of physicians, and a fluctuation of vacancies at various levels including positions for physicians and a service-unit director (this was recently filled). Physicians and nurses have a heavy daily patient load. Patients requiring hospitalization are sent to a local hospital in a nearby farming community 14 miles to the north, and to two larger regional medical centers 100 and 150 miles away. Recent field hearings (Select Committee on Indian Affairs, U.S. Senate 1983, 1984) on the current status of Indian health in the larger IHS Aberdeen Area that includes this clinic have highlighted the problems of reservation patients: lack of availability of transportation to adequate medical facilities, long waits in the clinic to see the doctor, and difficulties in gaining emergency admissions into non-IHS contract hospitals. Some of these problems may be less severe at Ft. Totten than at larger and more remote reservations in South and North Dakota, but all the above problems are important concerns of both tribal members and subject to vocal criticism outside the clinic setting.

Nurses and the pharmacist are especially important in communicating information about the doctor's diagnosis and advice, especially when the doctors have heavy schedules. Some elderly patients, for whom English is a second language, have an obvious need for translation. Health workers who have been at the clinic for a number of years may be counted on by patients for clarification of the doctor's explanation and prescriptions. Over time, some of these health care workers become familiar with the medical history of patients, may be aware of their household and larger family organization, crises that may have occurred, and the general pattern of life and events on the reservation. Despite a growing number of Indian Health care professionals—especially through the Indians-Into-Medicine Program at the University of North Dakota Medical School—none of the registered nurses or doctors at Ft. Totten Clinic currently are Indian.

The Diabetes Program has benefited from only one turnover in staff during the past four-and-a-half years: the initial director was a Catholic nun, R.N., of white-Indian ancestry who grew up on a local farm near the reservation. The current practical nurse on the Diabetes Program staff is a middle-aged Dakota woman who grew up in the community and has worked for many years in social and health services on the reservation. Many people comment about these individuals saying that "she knows us because she is from here, you know," or "she has visited us in our home and knows us." White-Indian distinctions (and Dakota/non-Dakota distinctions as well) are important factors in interactions and perceptions of people in this community. These distinctions have particular significance with respect to a white-dominated clinic serving an Indian population. Given the fact that there are not enough Indian (or Dakota) health care workers to fill some of the clinic positions, the importance of continuity of health care workers can be seen as crucial for the provision of good health care.

The Diabetes Program Office, located just off the general waiting room of the larger clinic, is open each day of the week for both walk-ins and scheduled patient visits. These involve blood sugar determinations (generally random blood sugar test, though 2-hour post-prandial blood sugars are carried out on new patients; pre-natal screenings are done on all pregnant women at 28 weeks in this office as well), blood pressures are taken and clients are weighed. The consulting endocrinologist from the University of North Dakota Medical School staff holds a full-day clinic every other week; appointment cards are mailed out during the previous two weeks to approximately 30 people who are due to see the doctor, and approximately 60% of these patients appear for the appointments. Walk-ins are also seen by the doctor, bringing the patients seen to 20–25 for the doctor's clinic day.

The initial Diabetes Program staff carried out the same general tasks, though the operation of the program has settled into a smoother routine over time. Despite the seeming low interest in following the diabetic dietary regimen, the two dieticians have successively adapted their educational efforts in an attempt to meet patient preferences. The former dietician developed a booklet and pamphlets in an attempt to write out and diagram dietary plans that fit in with her understanding of local food preferences and the types of food consumed. The present dietician spends more time meeting with individual patients and planning out menus that take into consideration their personal food preferences and uses of commodity foodstuffs. The practical nurse who knows many of the diabetics and their families visits homes with the dietician and/or R.N. director, drives patients who have no transportation to and from the clinic, and delivers medication (these tasks are also carried out by the Community Health Representatives). Special records of all diabetics are kept up-to-date and the files are checked periodically to see that all diabetics have been contacted for appointments and have actually come for an appointment over a given period of time. If not, additional efforts are made to call or pay a home visit, at which time a blood sugar test can be done.

In spite of the busy schedule of the endocrinologist, diabetics speak highly of his manner and his treatment plans. They also speak highly of the nurses and dietician. There is a general tendency for people to speak most positively of outside specialists who visit the clinic or to whom they are referred at other medical centers; likewise, patients enjoy the special status of the Diabetes Program office that is set apart from the rest of the clinic. The overworked and often changing physicians at the clinic are viewed much less favorably, and inevitable long waits do not contribute to patients' impressions. Diabetics and their family members have increasingly come to the Diabetes Office to report non-diabetes-related problems; staff members help channel them to the appropriate doctor or nurse in the larger clinic. These aspects of the Diabetes Program suggest the simple need for more personal contact time and communication between health care workers and clients at all levels within the service unit.

Due in part, perhaps, to the influence of medical and applied anthropologists, there has been a noticeable rise in interest by health care workers within the Indian Health Service and by state and local health agencies in adapting programs to understandings of traditional Indian cultures.[1] A growing number of workshops and health education programs are being offered at the community level by health care workers. Communication efforts between modern medical care providers and Indian leaders occur in both directions. Medicine men of the tribes represented in North Dakota have spoken on traditional holistic concepts and health and healing practices at university-related and state-sponsored symposia. Yet, at present, there are few practical applications or materials that actually attempt to integrate these two orientations for a program such as the Diabetes Program.

The real significance of such efforts in communication may be in the mutual recognition of two cultural traditions and acknowledgement of the ways in which health and healing and the experience of illness are handled in each. It would appear obvious that understandings by health care workers of the cultural and situational factors of community life are important in providing good medical care to patients in any community; this includes awareness of family and social organization, dietary patterns and preferences, home remedies and alternatives to Western medicine, economic limitations and priorities, and a recognition of local or traditional medical beliefs and practices.

However, overemphasis on the differences in two cultural traditions or an attempt to blend some aspects of these two traditions may simply be a smokescreen if the realities and problems of Western health-care delivery in Indian communities are neglected. In all communities, people choose alternative strategies in drawing upon health care resources that meet different needs in the illness experience (Singer 1977; Westermeyer 1976). Indian people feel strongly that, by treaty, Indian people have the right "as long as the grass shall grow" (Schultz 1976) to demand the same quality health service available to other Americans. While Dakota people are proud of their traditional health concepts and may draw selectively upon resources of alternative medical care or traditional medicine, the great majority of people at Devil's Lake are regular users of Western medical services.

The Diabetes Program, as a demonstration project, is attempting to tailor its services to the diabetic population and has benefited by 1) including Dakota health workers, 2) maintaining a continuity of staff, 3) recognizing food preference and acknowledging difficulties that all diabetics have in day-to-day adherence to dietary regimens, and 4) increasing the number of home visits and personal contact with patients. This clinical effort, nevertheless, can only be reinforced with tribal involvement in community health.

The Office for Tribal Health and the Tribal Health Committee

One of the divisions of the Devil's Lake Sioux tribal government is the Office of Tribal Health. During the past five years, there have been two non-Indian directors, each subsequently moved into hospital administrator positions in non-reservation facilities. Currently, this office is headed by a new director, a young university-trained Dakota woman who grew up in the community. She oversees a variety of programs, including tribally-run Indian Health Service programs, federally-funded special programs, and some cooperative state-tribal projects. The Office of Tribal Health also includes the Community Health Representatives, the mental health program, the chemical dependency program, the group home, the rest home, and the environmental health operations. Under the present leadership, this office is also increasingly perceived as a health advocate for individuals with problems or complaints regarding the clinic.

The Tribal Health Committee, composed of community members representing each of the four reservation districts, meets on a monthly basis with the Director of Tribal Health. This committee in recent years has been relatively inactive, meeting erratically to screen job applications for tribal health-related positions. They are occasionally called upon to co-sponsor a public speaker or panel that has been planned elsewhere. In its role as liaison between community members and the tribal structure regarding health-related issues, this committee is potentially a powerful one. With the support of the Tribal Council, the Tribal Health Committee may make significant recommendations and generate programs and policies that affect direct health care delivery and community health in general.

If major community health education and preventative medicine campaigns are to occur, or if the tribe decides to take over more of the health services than at present (as provided for by the Indian Self-Determination Act), it would be through the Office of Tribal Health and with the advisement by the Tribal Health Committee. It appears unlikely that in the near future the IHS service unit would be transformed into a tribally-run clinic (e.g., Winnebago, Nebraska or Seminole Reservation clinics). However, there is increasing concern and dissatisfaction with cutbacks in many community-based programs started during the more affluent period of federal spending in the early 1970s (Office of Tribal Health 1979). Participation by community members in outlining health needs and in determining health care objectives is best undertaken by structures that are currently in place.

Conclusion

The Diabetes Program, as a case in point, started an effort that can only succeed in its larger objective of diabetes prevention and more effective management of diabetes through community involvement. Though diabetes has taken Indian people by surprise, and despite the serious complications that can result from uncontrolled diabetes, there is a very positive outlook at Devil's Lake. Progress will be made if ideas of lower body weights and weight control, shifts in dietary emphasis, and increased physical activity take hold—whether through the current resurgence of traditional cultural concepts or along the lines of similar trends in the larger American society. Such efforts can be successful as the tribally-sponsored weight reduction program reported by Rye (1983) for the Keweenaw Bay Indian Community in Michigan. The Dakota, as other Indian peoples, have valuable resources in their concept of physical/spiritual well-being as a unity and in their traditional "way back" dietary patterns of a wide variety of natural foods. These complex traditions, with focused community and tribal action, can be used to complement and reinforce the medical resources that are currently available in dealing with a number of health-related problems, diabetes in particular.

NOTES

[1] "Western" medicine used here refers to Euro-American or what is commonly called "modern" medical concepts and practices. As Worsley (1982:315) points out, the converse, "non-Western medical system" can be seen as both ethnocentric and problematic because of factors such as long interactions between medical traditions and because of widespread uses of "alternative" medical practices that occur in all societies. Native Americans, like other ethnic groups within the U.S., participate to varying degrees in the institutions of the larger majority society, while concurrently participating in the life of their particular communities; these issues must be recognized in any attempt to characterize patterns in a contemporary American Indian community.

[2] The locations of the Five-Sites Model Diabetes Program of the Indian Health Service include the Claremore Service Unit, Oklahoma; Winnebago Service Unit, Nebraska; Sakaton Service Unit, Arizona; Albuquerque IHS Hospital; and the Ft. Totten Service Unit in North Dakota. These sites are located in areas where diabetes is an increasing health concern of Native Americans, and where there was an existing IHS clinic or hospital that served a significant proportion of that population.

[3] There are few comprehensive studies of nutrition among Plains region Native Americans. Bass and Wakefield (1974) review studies of nutrition and examined nutrient intake and food patterns at Standing Rock Reservation. They found that most female residents were overweight, yet nutrient intakes were frequently below recommended allowances, particularly among the elderly (1974:40). Food preferences and ideas of body weight were similar to those reported here for Devil's Lake Sioux. Joos (1984) and Judkins (1978) report dietary patterns and obesity among the Seminole and Seneca, respectively, that are comparable with the Sioux though there are regional differences in food preferences.

[4] In a study of perspectives on modern medical care by Lakota Sioux of the Rosebud Reservation, Ford (1966) found that traditionalists who used *Yuwipi* healing rituals and those who relied primarily on herbal remedies attributed many [illegible] the present-day diseases of Indian people to modern processed and/or canned foods. Likewise, these respondents felt that their general state of health had greatly declined since European contact (1966:99). *Yuwipi* followers, in particular, sometimes refused both injections and surgery (1966:90). Though injections did not appear to be a problem for patients at Devil's Lake, there was great antipathy towards surgery that would involve removal of any part of the body. Diabetes is especially feared because of known cases in which amputations of lower extremeties have occurred.

[5] Fry bread, considered a hallmark of Native American cooking, is a fried dough made from white flour, lard or shortening, baking soda, sugar, salt, and fried in fat; it incorporates the basic staples of European frontier cooking. Fry bread is served regularly in many homes (including 14 of the 20 diabetic households in this study), and is ever present at social occasions of all types. In an analysis of nutrients and Nutrient Calorie Benefit Ratio (NCBR) of fry bread and six other North Dakota Indian dishes, Toma and Curry (1980) found fry bread to be low in NCBR and all seven dishes high in calories. These seven recipes reflect the dietary change undergone by the Sioux discussed in this paper.

[6] Tuberculosis is perceived by people at Devil's Lake as a European introduction. While paleopathologists are not decided regarding the pre-Columbian existence of tuberculosis in the New World, it is generally agreed that the epidemics of infectious tuberculosis among virtually all reservation populations were enhanced by poor environmental conditions (Buikstra 1981:4–5).

[7] Schultz (1976) has described Western Plains Indian cultures and societies for Indian Health Service personnel, with particular attention to traditional medical beliefs and practices and present-day use of Western medical care by residents of eight reservations (Billings Area of the IHS).

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PREPARED STATEMENT OF DR. TERRENCE W. SLOAN, M.D., DIRECTOR, ABERDEEN AREA INDIAN HEALTH SERVICE

My name is Dr. Terrence W. Sloan, Director of the Aberdeen Area Indian Health Service. It is the mission of the Indian Health Service to raise the health status of the Indian people, in this case the Mandan, Hidatsa, and Arikara Tribes of North Dakota to the highest possible level. In striving to carry out this goal, it is our responsibility to deliver high quality health services, to assist tribes in developing and managing health programs, and to act as advocates in health related matters.

Numerous health related problems exist in disproportionately high levels among Indians in general and specifically among members of the Three Affiliated Tribes. Many of these health problems are preventable and rooted in part to nutritional factors.

It is essential that there be greater understanding of these health problems if we are to succeed in our efforts to raise the health status of the Three Affiliated Tribes to the highest possible level. I would like to present a series of overheads that illustrate the unacceptably high overall mortality and morbidity rates for Aberdeen Area Indians and Indians of Ft. Berthold Service Unit.

Overhead #1 - AGE ADJUSTED DEATH RATES ALL CAUSES
This compares death rates between Aberdeen Area Service Units/U.S. All Races and American Indians. The Age Adjusted Death rates for all cause for Ft. Berthold is more than twice that of the U.S. All Races and American Indians.

Overhead #2 - AGE ADJUSTED DEATH RATES FOR SELECTED CAUSES
Ft. Berthold Service Unit. The rates in parenthesis are for the Aberdeen Area. As you can see, there are many disparities. (Ft. Berthold Service Unit has the highest rate in the Aberdeen Area for malignant neoplasms, alcoholism and chronic liver disease.) Many of these diseases are influenced or caused in part by factors including nutrition.

Let us now consider some specific disease entities.

Overhead #3 - AGE ADJUSTED CARDIOVASCULAR DEATH RATES
Again, the rate for Ft. Berthold's Service Unit is far greater than that of U.S. All Races and American Indians.

Overhead #4 - CRUDE INFANT MORTALITY
This is recognized as a leading statistic in indicating the health status of a given population. Ft. Berthold infant mortality is the highest among the tribes in North Dakota and almost 3 times higher as compared to all American Indians and U.S. All Races.

Overhead #4 cont.

The effects of a woman's diet on her children start long before she becomes pregnant. Stores of fat, protein and other nutrients built up over the years are called upon during pregnancy for fetal nourishment. The fetus is sometimes more affected than the mother by lack of nourishment, and there is a relationship between maternal weight gain and growth and development of the fetus. The effects of undernutrition on infant size is greatest when nutritional deprivation occurs during the final three months. Excessive weight gain in the second trimester is due mostly to increases in tissue, blood volume, and fat stores, and enlargement of the uterus (womb) and breasts. The consequences of dietary or substance abuses during pregnancy range in severity from fetal death to very subtle effects such as a change in the functional capacity of the newborn. Low birth weight is associated with increased mortality and morbidity including a higher incidence of congenital abnormalities, poor postnatal growth, and increased susceptibility to infection.

The morbidity associated with pregnancies affected by diabetes may be substantial, since diabetes may result in a disproportionate number of adverse pregnancy outcomes. The combination of diabetes and pregnancy presents a special challenge in the public health care setting. Diabetes in pregnancy can lead to serious complications for both the mother and fetus unless blood sugar levels are carefully controlled. Offspring of women with diabetes experience high rates of:

- Mortality
- Prematurity
- Congenital defects
- Macrosomia (infants weighing more than 9 pounds)
- Hyperbilirubinemia
- Respiratory distress syndrome
- Hypoglycemia following delivery

Most congenital abnormalities occur during the first seven weeks of gestation. The pregnant woman with diabetes is at an increased risk of:

- Ketoacidosis
- Hypoglycemia
- Problems in delivery
- Preeclampsia (pregnancy-induced hypertension)
- Polyhydramnios

Very young adolescents and women older than 30 years are at increased risk of pregnancy complications and unfavorable fetal outcomes. The detrimental effects of alcohol abuse on human pregnancy are well documented. Fetal alcohol syndrome in infants born to alcoholic mothers may be a leading cause of mental retardation. May questions remain regarding the quantity, frequency, and time of intake of alcohol as well as the mechanism by which it adversely affects the fetus.

Overhead #5 - AGE ADJUSTED DIABETES MELLITUS DEATH RATES

Proper nutrition is paramount in the management of this disease but plays a key role in the prevention in the onset of this disease. The Ft. Berthold death rate due to Diabetes Mellitus is highest in the Aberdeen Area. It is close to 12 times higher than the U.S. All Races.

A prevalence study of 1985 found that the rate of persons with diabetes for all ages on Ft. Berthold Reservation was 3 times the national average. Overall 6.8% of the population has diabetes. In the age groups 45 years and older, 1 in every 3 individuals have diabetes.

Overhead #6 - YPLL RATE COMPARISON FOR ABERDEEN AREA SERVICE UNITS

Another health status indicator which has been useful in measuring the overall health of a populations is years of productive life lost - YPLL. Here we see many premature deaths when this health status indicator is considered. The rates per 100 population for U.S. All Races in 81-83 and 82-84 are 6.1 and 6.0 respectively. For Aberdeen Area the respective rates for the same time period are 18.4 and 16.4 respectively. For Ft. Berthold the rates are 21.7 and 15.9.

An explanation for the high prevalence of diabetes and mortality rates is complicated and remains under study. The health care system as it exists today - the Minne Tohe Health Center and health stations in Mandaree, Twin Buttes, and White Shield address the problem on a daily basis. Certainly the inundation by the waters of the Garrison Dam in 1954 had a profound and lasting impact on the health delivery system and health seeking behaviors of Indian people. The governmental hospital on the reservation at Elbowoods, North Dakota was flooded and not rebuilt after the mass relocation of Indians from the "taking area."

The effects of the Garrison Dam on the health status of the Three Affiliated Tribes is difficult to measure. Reading from the Report to the Joint Tribal Advisory Commission, May 1986, "if we hypothesize that the disruptions caused by the dam directly affected social and behavior patterns and caused increased stress, we may expect higher incidences of alcohol related problems." These problems may cause less ability to focus on the development and maintenance of health nutritional habits among all age groups.

The nutritional problems at Ft. Berthold, ND might be more readily described as malnutrition rather than hunger. The morbidity related to the nutritional status of the population is a result of diseases associated with overweight and obesity such as diabetes, hypertension and cardiovascular diseases. Excess alcohol consumption may well be the single most serious nutritional problem on the reservation today, accounting for considerable morbidity and mortality due to accidents, domestic violence, cirrhosis of the liver, and malnutrition.

A Nutrition and Fitness Survey completed in 1984 analyzed the nutrition and health knowledge of 499 or 70% of the Ft. Berthold head of households. Sister Anna Rose Ruhland, R.D., Tribal Nutritionist, was the primary investigator. The respondents indicated that:

82% participated in a food assistance program.
81.3% indicated no trouble traveling to obtain food.
84.5% indicated that they did not run out of food in the month so that family members go hungry.
86.1% of households had enough food for all family members.
69.1% of households felt that their income was enough to buy food for everyone who lived there.

Approximately 15% of households, therefore, encounter the above mentioned nutritional problems. The significance of the food assistance programs currently available on the reservation such as commodities, WIC, Food Stamps, Headstart, School Feeding Programs, Senior Citizens Lunches, and others is obvious. In consideration of high unemployment rates, a greater portion of the population would be at nutritional risk without these programs.

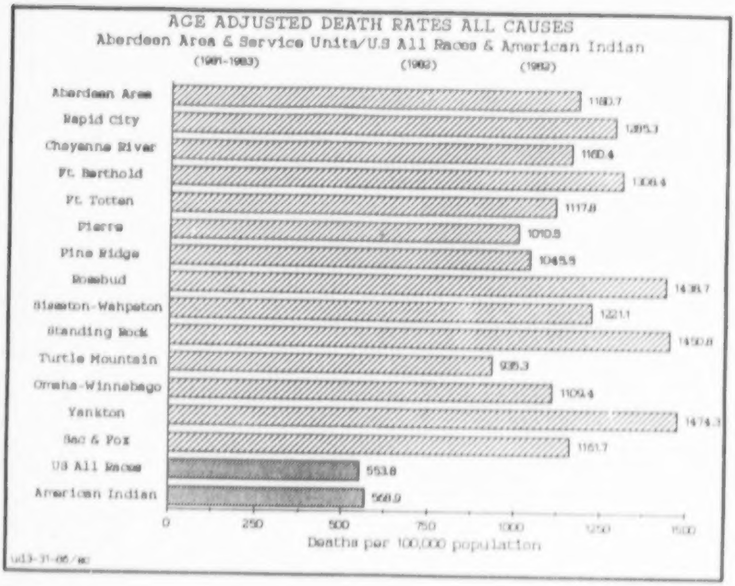
The survey further pointed out that there was a high level of knowledge of what constituted healthy foods, disease prevalence and symptoms, and lifestyle changes (such as diet and exercise) necessary to promote improved health status. The motivation to make these lifestyle and behavioral changes requires further consideration.

An analysis of nutritional patterns revealed that a high percentage of foods high in sugar, fat and salt are consumed. Fifty-eight percent of households reported fat-fried food preparation on a daily basis. Favorite restaurant foods were hamburgers, french fries, pop, steaks and potatoes. Alcohol consumption may be excessive.

Conversely, high numbers of households reported considerable consumption of fresh fruits and vegetables, whole grain breads and cereals, fish and venison. Fresh vegetables were grown by 27% of households and 28% reported the possession of an extra freezer unit.

In summary, households of the Three Affiliated Tribes suffer from the same lifestyle and nutritional habits that contribute to modern chronic diseases found in the general population. These conditions are exacerbated by the socioeconomic conditions on the reservation. Overweight, obesity and excessive alcohol consumption contribute considerably to morbidity and mortality. Currently existing food assistance programs provide considerable relief from hunger and should continue to be supported. Health education and motivation programs to promote wise food choices and the adoption of positive behavior and lifestyle changes are necessary.

The Nutrition and Fitness Survey mentioned above is highlighted and attached for further information.


AGE ADJUSTED DEATH RATES ALL CAUSES
Aberdeen Area & Service Units/U.S All Races & American Indian
(1981-1983)
(1982)
(1982)
Aberdeen Area
Rapid City
Cheyenne River
Ft. Berthold
Ft. Totten
Pierre
Pine Ridge
Rosebud
Sisseton-Wahpeton
Standing Rock
Turtle Mountain
Omaha-Winnebago
Yankton
Sac & Fox
US All Races
American Indian
1180.7
1285.3
1160.4
1306.4
1117.8
1010.5
1045.5
1438.7
1221.1
1450.8
935.3
1109.4
1474.3
1161.7
553.8
568.9
0
250
500
750
1000
1250
1500
Deaths per 100,000 population
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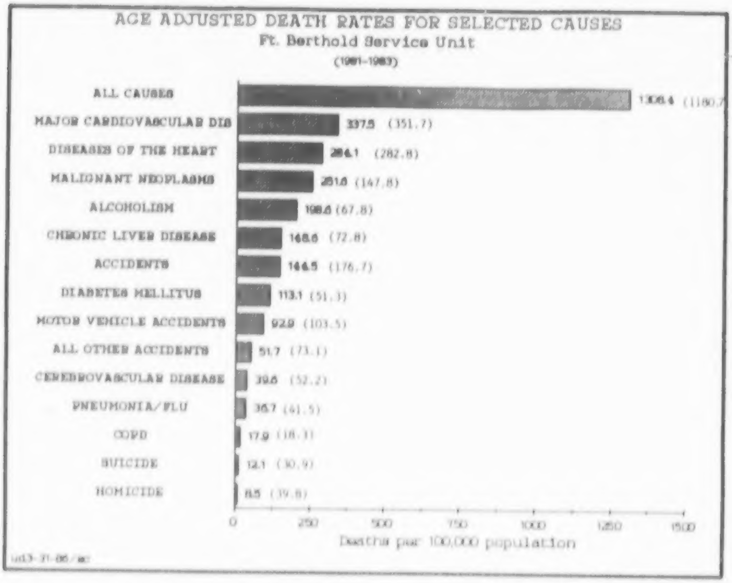
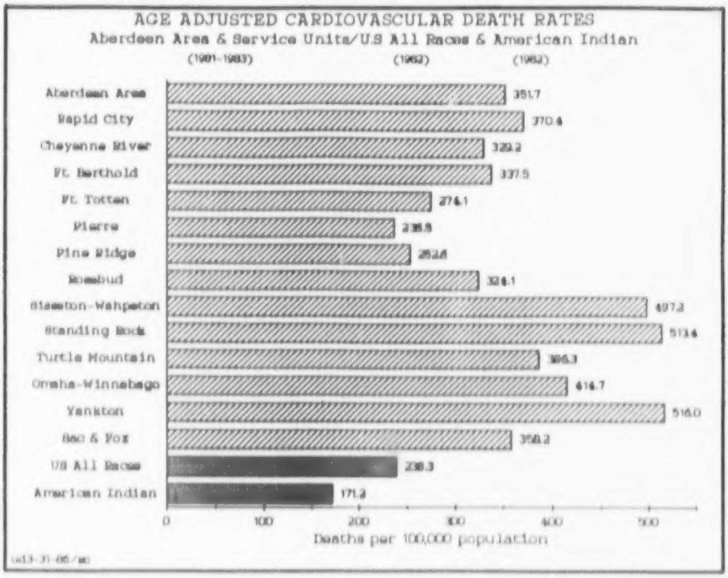
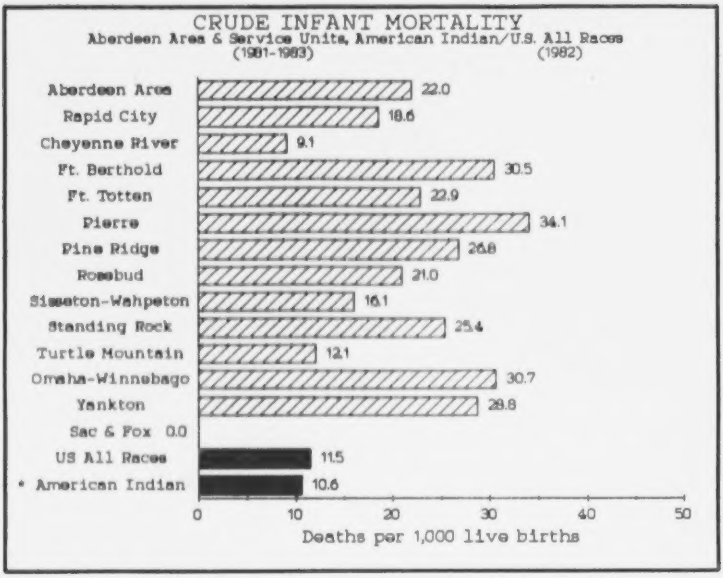
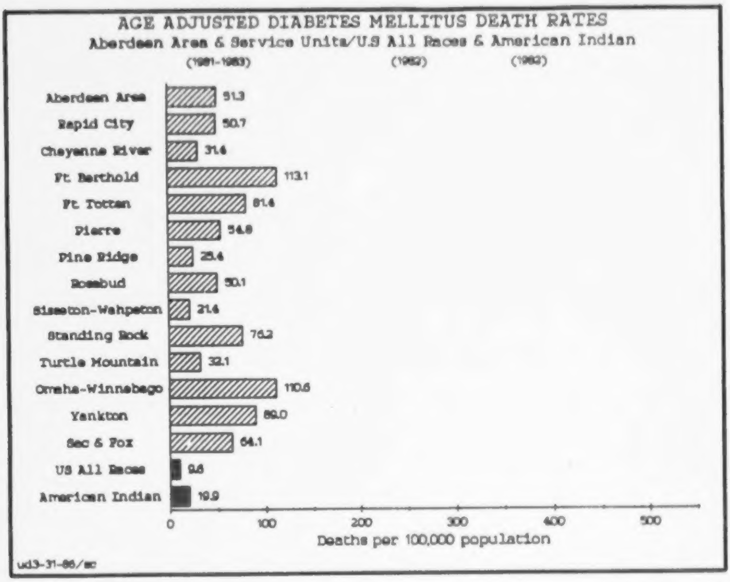


( ) Aberdeen Area Death Rates

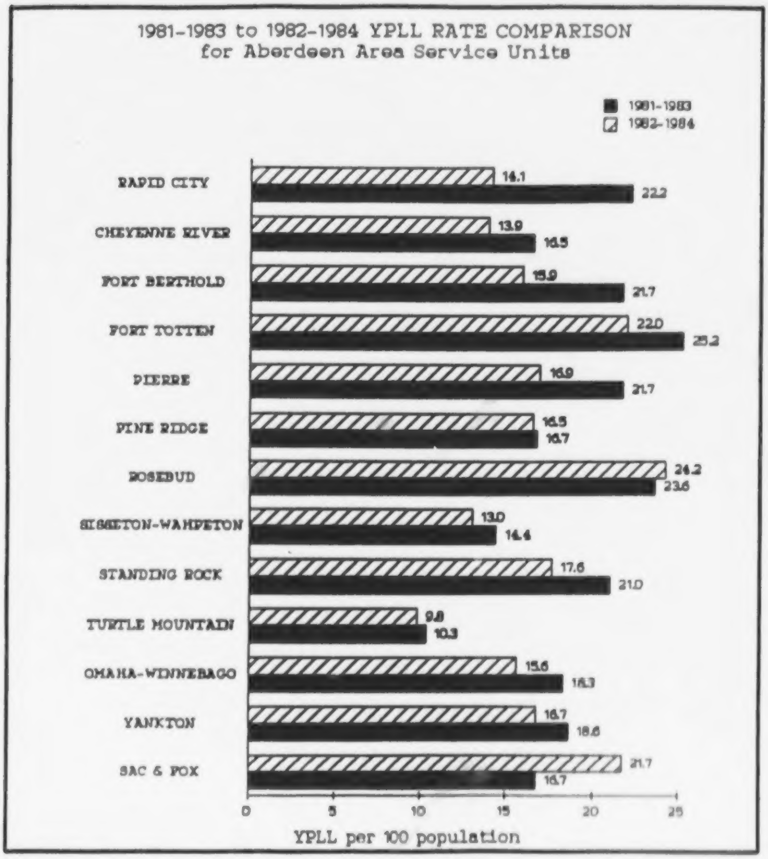

AGE ADJUSTED CARDIOVASCULAR DEATH RATES
Aberdeen Area & Service Units/U.S All Races & American Indian
(1981-1983)
(1982)
(1982)
Aberdeen Area
Rapid City
Cheyenne River
Ft. Berthold
Ft. Totten
Pierre
Pine Ridge
Rosebud
Sisseton-Wahpeton
Standing Rock
Turtle Mountain
Omaha-Winnebago
Yankton
Sac & Fox
US All Races
American Indian
351.7
370.4
329.2
337.5
274.1
236.5
252.6
324.1
497.2
513.6
386.3
416.7
516.0
358.2
238.3
171.2
0
100
200
300
400
500
Deaths per 100,000 population
ud3-31-86/sc



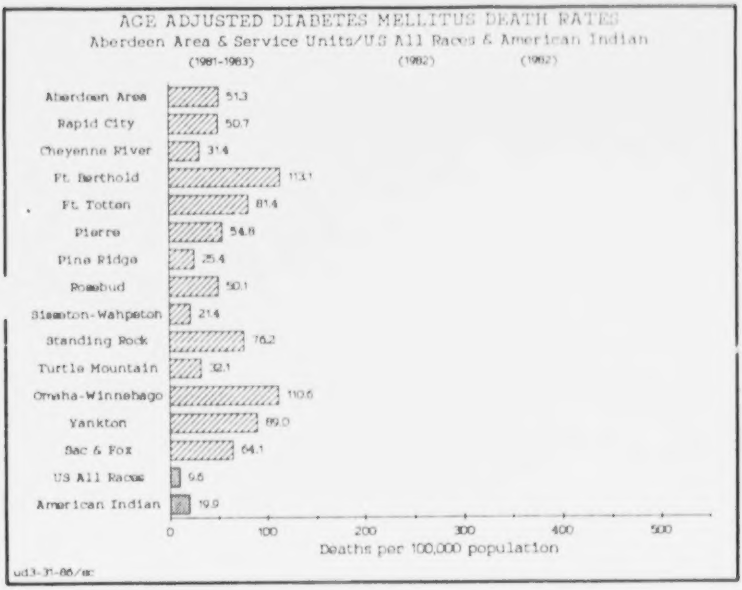
* Excludes Alaska Natives.



AGE ADJUSTED DIABETES MELLITUS DEATH RATES
Aberdeen Area & Service Units/U.S All Races & American Indian
(1981-1983) (1982) (1982)

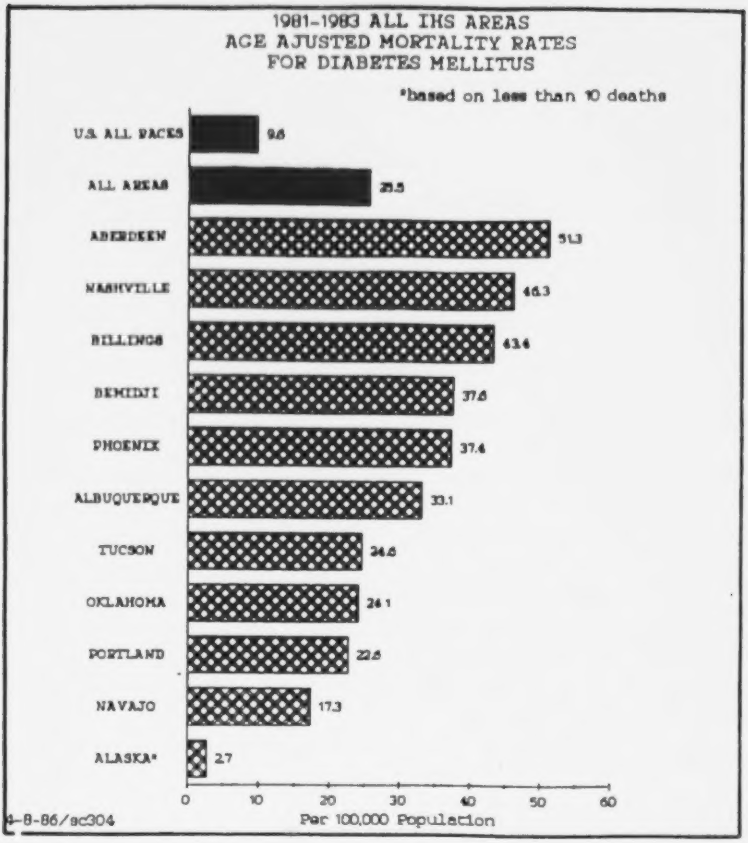


1981-1983 to 1982-1984 YPLL RATE COMPARISON
for Aberdeen Area Service Units

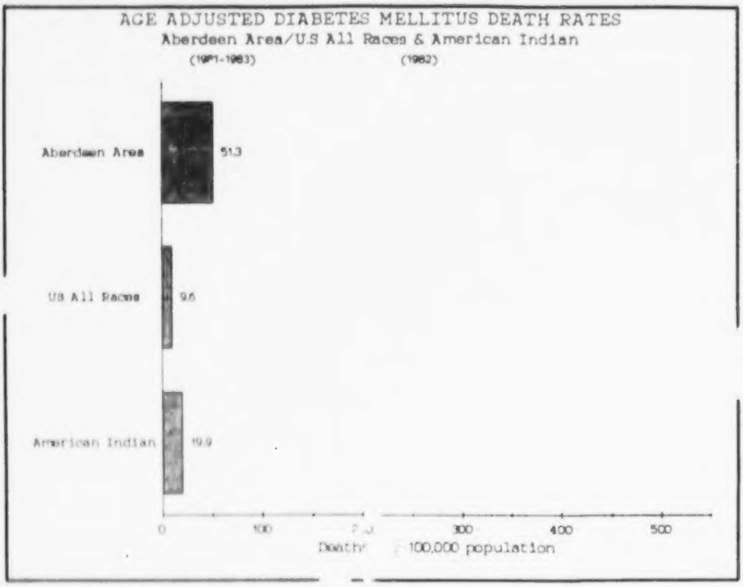


AGE ADJUSTED DIABETES MELLITUS DEATH RATES
Aberdeen Area & Service Units/U.S All Races & American Indian
(1981-1983) (1982) (1982)

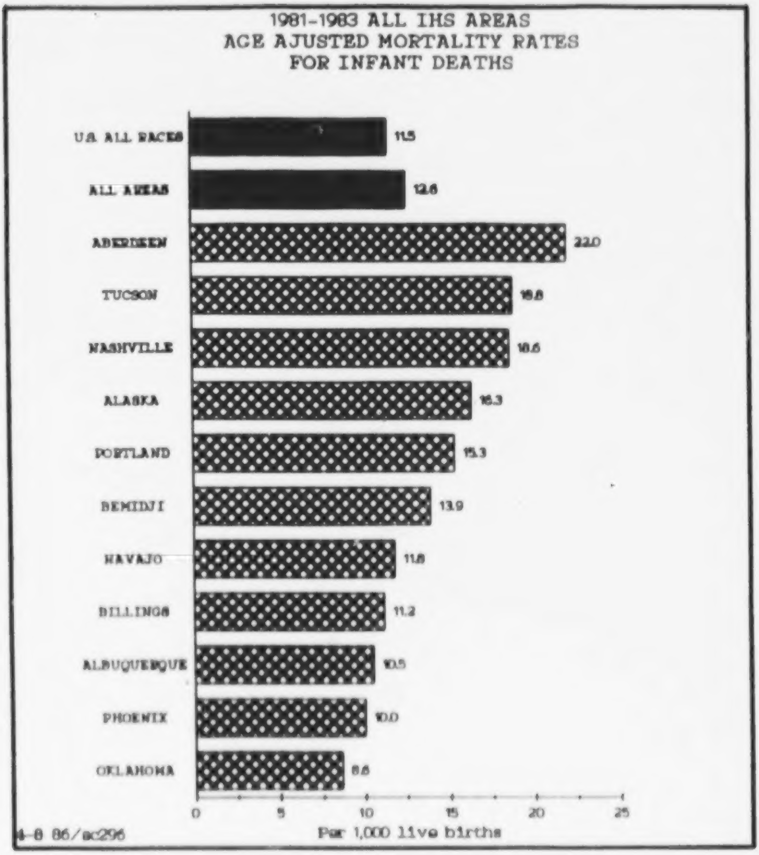
Source: Indian Health Service



Source: Indian Health Service



Source: Indian Health Service



1981-1983 ALL IHS AREAS
AGE AJUSTED MORTALITY RATES
FOR INFANT DEATHS

Source: Indian Health Service

FORT BERTHOLD RESERVATION FACT SHEET

Socioeconomic Data

Indian Population: 3,310 (1980 Census)

	Reservation	U.S.
Unemployment Rate: (January 1987)	47%	6.6%

* Rate estimated to be 70%-80% during the Winter season when construction-type employment opportunities are lowest.

	Reservation	U.S.
Poverty Rate: (1980 Census)	44%	11.7%
Per Capita Income (1982):	$4,069	$8,980
Median Houshold Income: (Family of 4, 1980 Census)	$10,258	$22,579
Percent of Adults Completing High School(1980 Census):	53%	65%

Health and Nutrition Data

Comparative 1982-1984 Death Rates
Per 100,000 Population
(Indian Health Service, IHS)

	Fort Berthold Service Unit	Aberdeen Service Area*	Nationwide IHS Pop.	U.S. Total
Diabetes	111.1	34.4	19.5	15.5
Infant Mortality	26.7	20.4	11.7	11.2
Alcohol Related	70.7	33.0	26.6	28.9

*Aberdeen Area includes Indians served in North Dakota, South Dakota, Nebraska, and Iowa.

Incidence of diabetes on Fort Berthold is also relatively higher than those for other areas as the follwing chart displays:

Rate of Hospital Discharges With Diabetes
Per 10,000 Population
Fiscal Year 1986, (IHS)

	Fort Berthold Service Unit	Aberdeen Service Area	Nationwide IHS Pop.	U.S. Total
Diabetes Disharge Rate	58.9	52.8	23.7	20.3

Fifteen percent of Tribal households stated in a recent survey that they did not have enough food each month for all members of their families.

Participation in Food Assistance and Income Maintenance Programs

Food Stamp Program	107 Households (1985 avg. monthly)
Food Distribution Program Indian Reservations**	384 Households = 1297 Persons on (1986 avg. monthly)
Supplemental Feeding Program for Women, Infants and Children (WIC)	480 (1986 avg. monthly)
Head Start	112 Children (1986-87 School Yr.)
Title VI Elderly Nutrition**	43 Meals Per Day (35 Congregate and 8 Home-Delivered Meals)
General Assistance	263 Cases = 540 Persons
Aid to Families with Dependent Children	219 Cases = 500 Persons
Low Income Home Energy Assistance Program (LIHEAP)	344 Households

**Description of Special Food Programs for Indians

Food Distribution Program on Indian Reservations - the major food assistance program on the reservation. When the Food Stamp Program replaced the national commodity distribution program in the 1970's, Congress permitted tribes to continue operating both programs. Eligible individuals can choose to participate in either of the programs, though not in both simultaneously. Most Indians choose the Food Distribution Program because of the limited quantity and variety of foods available at retail food outlets on reservations. Eligibility requirements are based on the criteria used in the Food Stamp Program.

The intent of the program to provide nutritious foods is clearly stated in the authorizing legislation: "In providing for commodity distribution to Indians, the Secretary (of Agriculture) shall improve the variety and quantity of commodities supplied by Indians in order to provide an opportunity to obtain a more nutritious diet."

Title VI Elderly Nutrition Program - the only food assistance program targeted to the elderly. Title VI of the Older Americans Act authorizes grants to Indian Tribes for the delivery of supportive and nutrition services to older Indians. Forty-three meals per day are provided at congregate meal sites or delivered to the homebound. The tribe reports that there are 400 potentially eligible older adults who cannot be served because of limited funds.

ACCESSIBILITY OF RETAIL FOOD OUTLETS AND HEALTH CARE

Only two full-service retail food outlets and four "convenience" stores are located on the entire Fort Berthold Reservation. The limited quantity and variety of groceries at these outlets often results in tribal members traveling to North Dakota's major cities all located over 60 miles from the Reservation communities. A recent Tribal survey indicated 18% of heads of households having trouble in traveling to acquire food.

Because there is no hospital and only one major health clinic on the reservation, 26% of households have to travel 50 to 100 plus miles to obtain medical care (Tribal survey).

HOUSING*

Total Number of Existing Housing Units - 571

Housing Units in Substandard Conditions - 195 or 34$

Additional Families Needing Housing - 288

*Source - Tribal Business Council, Fiscal Year 1987 data

ECONOMIC DEVELOPMENT AND EMPLOYMENT TRAINING

The Three Affiliated Tribes do not currently possess a funded economic development "program". The possibility of receiving an Economic Development Administration Planning Grant is being explored. The Tribes have a Small Business Developmet Loan Fund which provides about $125,000 per year in loans. The Bureau of Indian Affairs (BIA) has a Loan, Loan Guarantee, and Loan/Grant Program available under the Indian Finance Act.

Employment and training is available through the Tribes' Job Training Partnership Act Program to income-eligible adults and youth. The BIA also provides vocational training and relocation funds.

The Tribal Employment Rights Office of the Three Affiliated Tribes works with major contractors on Federally funded projects to ensure both individual and contracting work opportunities for Tribal members.

In the future, the Three Affiliated Tribes would like further funding to accomplish the following: irrigation to improve the agricultural capacity of their lands; development of the recreational capacity of Lake Sakakawea; and, job creation and economic development. (*These are recommendations from the report of the Secretary of the Interior's Garrison Unit Joint Tribal Advisory Committee).

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
MEAT GROUP

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Canned vegetarian beans (1 lb. can)	2	4	6	8	10	12	14	16	18	20	---
Dry beans (2 lb. bag)	1	2	3	4	5	6	7	8	9	10	Pinto, Pink, Small Red, Pea (navy), Great northern, Kidney, Baby Lima, Blackeye, Black Turtle Soup
Egg mix (6 oz. pkg.)	2	4	6	8	10	12	14	16	18	20	---
Canned meat and fish (1.8 lb. can)	3	6	9	12	15	18	21	24	27	30	Beef, Meatball Stew, Poultry, Pork, Salmon, Tuna
	*Cans 15 oz. or smaller is issued on a 2 for 1 basis.										
Peanut butter (2 lb. can)	1 every 4 mo.	1 every 2 mo.	1	1	2	2	2	2	3	3	Chunky, Smooth
	*Peanuts may be substituted on a pound for pound basis.										
Peanuts (12 oz. can)	1	2	3	4	5	6	7	8	9	10	Roasted
	*Peanut butter may be substituted on a pound for pound basis.										

(10/84)

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
DAIRY GROUP

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Evaporated milk (13 oz. can)	8	16	24	32	40	48	56	64	72	80	---
	*Dry milk may be substituted as indicated above.										
Dry milk (4 lb. box)	1 every 2 mo.	1	2	2	3	3	4	4	5		---
	*Evaporated milk may be substituted at the rate of 6 cans per pound										
OR											
(1 lb. 9 oz. box)	2	3	4	5	6	8	9	10	12	13	---
	*Evaporated milk may be substituted at the rate of 6 cans per box.										
Process cheese (2 lb. loaf)	1	2	3	4	5	6	7	8	9	10	American
OR											
(5 lb. loaf)	1 every 2 mo.	1	2	2	2	3	3	4	4	4	

(10/84)

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
GRAIN GROUP

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Rice (2 lb. pkg.)	1 every 2 mo.	1	2	2	3	3	4	4	5	5	Brown, White
Oats (18 oz. bag)	1	2	3	4	5	6	7	8	9	10	---
OR											
(3 lb. pkg.)	1 every 3 mo.	1	1	2	2	2	3	3	3	4	
OR											
Wheat (10 lb. bag)	1 every 10 mo.	1 every 5 mo.	1 every 3 mo.	1 every 2 mo.	1 every 2 mo.	1	1	1	1	1	---
Corn products (10 lb. bag)	1 every 10 mo.	1 every 5 mo.	1 every 3 mo.	1 every 2 mo.	1 every 2 mo.	1	1	1	1	1	Corn Meal, Masa Flour

(10/84)

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
GRAIN GROUP
(Continued)

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Pasta (1 lb. box)	1	2	3	4	5	6	7	8	9	10	Macaroni, Spaghetti
Farina (16 oz. box)	1	2	3	4	5	6	7	8	9	10	---
OR											
Infant Rice Cereal (16 oz. box)	NOTE: Infant rice cereal is to be issued to infants only. *Smaller boxes (8 oz) are issued on a 2 for 1 basis.										---
Flour (5 lb. bag)	2	4	6	8	10	12	14	16	18	20	All Purpose, Whole Wheat, Bread
OR											
(10 lb. bag)	1	2	3	4	5	6	7	8	9	10	

(10/86)

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
VEGETABLE AND FRUIT GROUP

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Canned fruit (1.9 lb. can)	3	6	9	12	15	18	21	24	27	30	Applesauce, Apricots, Peaches, Pears, Plums, Pineapple, Prunes, Cranberry Sauce, Fruit Cocktail
or											
(1 lb. can)	6	12	18	24	30	36	42	48	54	60	
Canned juice (3.1 lb. can)	3	6	9	12	15	18	21	24	27	30	Grapefruit, Orange, Pineapple, Tomato, Apple, Grape
Canned vegetables (1 lb. can)	5	10	15	20	25	30	35	40	45	50	Green beans, Carrots, Corn, Peas, Sweetpotatoes Pumpkin, Spinach, Tomatoes, Potatoes
Dehydrated Potatoes (1 lb. pkg)	1 every 2 mo.	1	2	2	3	3	4	4	5	5	---
Dried Prunes (1 lb. pkg)	1	2	3	4	5	6	7	8	9	10	---
Raisins (1 lb. pkg)	1	2	3	4	5	6	7	8	9	10	---

(10/84)

Monthly Distribution Guide Rate for Food Distribution Program on Indian Reservations
OTHER GROUP

Item	Household Size										Choices
	1	2	3	4	5	6	7	8	9	10	
Shortening (3 lb. can)	1	2	3	4	5	6	7	8	9	10	---
Corn syrup (16 oz. bottle)	1	2	3	4	5	6	7	8	9	10	---
OR											
(24 oz bottle)	1	1	2	3	3	4	5	5	6	7	
Honey (3 lb. can)	1	1	1	1	1	1	1	1	1	1	---
OR											
(5 lb. can)											
Butter (2 lb. can)	1 every 2 mo.	1	2	2	3	3	4	4	5	5	---
OR											
(1 lb. print)	1	2	3	4	5	6	7	8	9	10	

[illegible] 84)

PREPARED STATEMENT OF ALONZO T. SPANG, SR., AGENCY SUPERINTENDENT, FORT BERTHOLD AGENCY, BUREAU OF INDIAN AFFAIRS, U.S. DEPARTMENT OF THE INTERIOR

Good day Mr. Chairman and Members of the Committee: I am pleased to be here today to discuss the socio-economic status of the Three Affiliated Tribes of the Fort Berthold Reservation and the role of the Bureau of Indian Affairs.

The three tribes that are organized with a single tribal government are the Hidatsa, Arickara, and Mandan. The Three Affiliated Tribes is governed by a Tribal Business Council which is elected by the adult tribal members. The reservation population is approximately 3,150 although the membership of the Three Affiliated Tribes is 7,341.

The Fort Berthold Reservation includes the six west-central North Dakota counties of Dunn, Mercer, McKenzie, Mountrail, McLean, and Ward and encompasses an area of approximately 1,550 square miles with 424,213 acres held in trust for the tribe or individual Indians.

There are two tribal contract schools, one cooperative school (public and tribal contract), and two public schools serving the Reservation, as well as a tribally controlled community college which provides many services and education opportunities to the Reservation and surrounding communities.

The Fort Berthold Reservation is primarily dependent on agricultural activities for its economy, although there are some oil and gas resources in the reservation. The BIA Report to Congress on BIA Agriculture and Range Programs (September 1986) states:

> Indian farming and ranching enterprises differ significantly from off-reservation operations. Smaller scale, lack of sufficient capital, isolation, increased distance to markets, and reduced land tenure terms contribute to a lack of long-term stability and increased impact from short-term market fluctuations or adverse weather conditions. A general lack of resource development increases drought impacts on Indian land, and results in a longer recovery period.
>
> A primary reason for the differences between Indian and non-Indian agriculture enterprises is that undivided and fractional heirship and tribal ownership prevents Indian operators from acquiring title to most of the lands in their operations. Indian farmers and ranchers are therefore dependent on leased lands with a term limited to five years by regulation. This results in a lack of collateral to support necessary capital acquisition and reduced involvement in USDA programs requiring long-term land tenure. As a whole, these influences result in under capitalized, small scale operations with minimal on-farm development, little stability, and complete dependence on fluctuating markets.

This description of the problems of the Indian farming and ranching enterprises adequately portray the problems encountered at the Fort Berthold Reservation.

The Bureau of Indian Affairs has been working with the tribe to find ways of expanding and developing the reservation resources. We are developing strategies for better use of water to develop our range programs and exploring the possibility of providing short-term loans to accomodate the farming and ranching needs. Both the Bureau and the Tribe are involved with the recently formed Indian Agriculture Commission that has been developed to address the needs of agricultural based Indian communities. We are hopeful that this Commission can be helpful in finding new ways to study and resolve some of our short and long-term economic problems.

The Bureau has worked closely with the tribe to assist them in developing and carrying out their own reservation programs. Currently, the tribe has 17 contracts with the Bureau, and one with the BIA to provide programs, studies and special projects. A list of these contracts is attached to my statement. This year the Bureau is also providing a full-time staff person to the tribe through the Inter-governmental Personnel Act (IPA) to assist them in planning and mapping the reservation road system.

The Bureau also works with the Indian Health Service to provide coordinated services on the reservation. We are presently working with the tribe to develop and implement a tribal action plan to address the alcohol and drug problem as required by the recent Omnibus Drug Act. I will defer to my colleague from the Indian Health Service to speak more directly to this effort.

In summary, the Fort Berthold Reservation, like most Indian reservations in this country is economically depressed and suffers from the same physical and social ills of other Indian reservations. But the structure of the tribal government at this reservation is strong. This tribe will continue to manage its own affairs and working with the Bureau, we hope to find new ways of developing the reservation economy.

This concludes my prepared statement. I will be happy to answer any questions you may have.

****

FORT BERTHOLD RESERVATION FY-1987 TRIBAL CONTRACTS

****

- Fish, Game & Recreation (638)
- Criminal Justice (638)
- Home Improvement Program [HIP] (638)
- Social Services Program (638)
- Johnson O'Malley (638)
- Adult Education Program (638)
- Tribal Realty Office (638)
- Aid to Tribal Government (638)
- Higher Education Program (638)
- Transportation Plan Study (638)
- Mandaree Day School (638)
- Twin Buttes Day School (638)
- White Shield School
- Water Resources Project (638)
- Irrigation and MI&R (638)
- Mineral Lease Compliance (638)
- Water Diversion Project (638)
- EDA Market Analysis (638)

HISTORY OF THE THREE AFFILIATED TRIBES

FORT BERTHOLD, NORTH DAKOTA

The Treaty of Fort Laramie, signed September 17, 1851, established the Fort Berthold Indian Reservation and defined the boundaries of the Hidatsa, Mandan and Arrickara Nations (Three Affiliated Tribes). The treaty confirmed their claim to a large area, totalling approximately 12.5 million acres, on the right bank of the Missouri River roughly bounded by the Heart, Yellowstone and Powder Rivers. Despite the provisions of the Treaty, subsequent executive orders and congressional acts whittled the original reservation down to less than 680,000 acres by the 1950s. (See attached map)

Notwithstanding this erosion of land base, the Tribes were able to establish a thriving and cohesive community in the rich and fertile Missouri River bottomlands. Unlike other Great Plains Nations, the Three Affiliated Tribes are a historically sedentary people who have always engaged in agricultural activities. The prime bottomlands of the Missouri River provided the Tribes with a "natural factory" that enabled them to establish a robust and reasonably self-sufficient economy by the 1940s.

The Flood Control Act of 1944 authorized the construction of five dams and reservoirs along the main stem of the Missouri River to provide hydroelectric power and prevent downriver flooding. One of these projects, the proposed Garrison Dam, required the confiscation of a large portion of Fort Berthold's choice bottomlands. The Tribes were adamantly opposed to the possibility of being forced from their treaty- protected lands. They argued that the residual highlands of Fort Berthold that would not be flooded were incapable of supporting their traditional ranching and farming activities. Congress recognized the Tribes' concerns and in the 1947 Civil Appropriations Act prohibited the War Department from proceeding with the construction of the Garrison Dam until a suitable replacement reservation could be offered. However, the War Department was unable to find a replacement reservation.

In 1947, the Federal government created a task force to study the feasibilty of moving the Three Affiliated Tribes in order to make way for the dam. The task force reported that without a very costly and complex rehabilitation plan, the residual highlands would be unable to support the traditional economic base. With construction of the dam already underway, in March 1950 P.L. 81-437 provided the Tribes $12.5 million as compensation for the taking of their lands and for the reestablishment of their lost communities on the residual reservation. Tribal leaders contend that they agreed to this sum very relunctantly, feeling intimidated and that this was their only option.

In 1953, the U.S. Army Corps of Engineers completed the construction of the Garrison dam. The resulting inundation of the Missouri River bottomlands claimed over 150,000 acres of the reservation's best agricultural farmland. It also forced the destruction of eight towns, the Tribes' only hospital, a key connecting bridge that spanned the Missouri River and the majority of the reservation's transportation network.

The rising waters physically divided and segmented the Three Affiliated Tribes. Ninety percent of the families of Fort Berthold lived along the banks of the Missouri River and had to be relocated to the reservation's upperlands. Communities that had been proximate and close-knit communities became isolated and dispersed throughout the reservation. The distance and division between tribal members was further exacerbated by the failure to replace the bridge that formerly linked the northern and southern parts of the reservation.

No adequate substitute industries have stepped into the vacuum created by the loss of the ranching and farming economies. The annual unemployment rate prior to the Garrison dam was between 5% and 6%; the present unemployment rate is 47% and rises to as high as 70% or 80% during the long winter seasons. The largest employers on the reservation today are the Bureau of Indian Affairs (BIA), the Indian Health Service and the local Tribal Council.

Additionally, the U.S. Army Corps of Engineers had promised to construct a replacement hospital, but the BIA recommended that hospital care be provided in cities and towns adjacent to the reservation rather than in a centrally located facility on the reservation itself. The Tribes, however, did not agree with this decision. They feel that improved access to health care facilities would help to address their alarmingly high rates of infant mortality and deaths from diabetes, cancer and suicide. The long distances to health care facilities, along with their high levels of unemployment and poverty, contribute to nutrition related disease rates that are much higher than rates for all U.S. Indians and the U.S. population as a whole. (See attached fact sheets)

The Tribes have long argued that the $12.5 million offered as compensation in 1950 was inadequate. In May ,1985, the Secretary of the Interior's Garrison Unit Joint Tribal Advisory Committee (JTAC) investigated "the inequities borne by the tribes" due to the impoundment of Missouri River waters. JTAC reported that the $12.5 million was indeed inadequate and that additional compensation ranging from $178.4 million to $411.8 million should be provided to the Tribes. (See attached outline of JTAC's recommendations)

NOTE: On March 31, 1987, a hearing was held before the Senate Select Committee on Indian Affairs, the Senate Energy and Natural Resources Committee, and the House Subcommittee on Water and Power Resources of the House Interior and Insular Affairs Committee, to discuss JTAC's findings and recommendations. Legislation incorporating JTAC's recommendations for compensating the Fort Berthold and the Standing Rock Reservations may soon be introduced in both the Senate and House.

GARRISON UNIT JOINT TRIBAL ADVISORY COMMITTEE RECOMMENDATIONS FOR THE FORT BERTHOLD RESERVATION

(1) **Development of the full potential for irrigation** on the Fort Berthold Reservation (107,000 acres).

(2) **Financial assistance for on-farm development.**

(3) **Development of the shoreline recreation potential of Lake Sakakawea** - docks, campgrounds, resorts, picnic areas, boat ramps, etc.

(4) **Return of possible excess lands not required by the Army Corps of Engineers (COE) for reservoir operations:** the Committee recommends further study to determine whether certain lands under the administration of the COE are superfluous to project operations and should be returned to the Tribes.

(5) **Protection of water usage rights:** Utilizing water on the irrigation project and the water system described in the report will help define the Tribes' right to water if future adjudication for scarce water rights is necessary.

(6) **Replacement of infrastructure** lost by the creation of Garrison Dam and Lake Sakakawea: a) health care facilities; b) a transportation network - highways, roads to isolated homes, and a bridge; c) housing; and, d) boarding school facilities.

(7) **Preferential rights to Pick-Sloan Missouri River Basin Power.**

(8) **Additional financial compensation** to the Tribes for the original taking of their treaty-protected bottomlands (between $178.4 million and $411.8 million was recommended).

(9) **Other important items:** a complete municipal, industrial and rural water system; establishment of an "Indian desk" within the COE; and, the transfer of credit programs from the Farmers Home Administration to the Bureau of Indian Affairs.

Source: These recommendations are from a report issued to the Secretary of the Department of Interior on May 23, 1986 (Final Report of the Garrison Unit Joint Tribal Advisory Committee, Bureau of Indian Affairs, U.S. Department of the Interior).

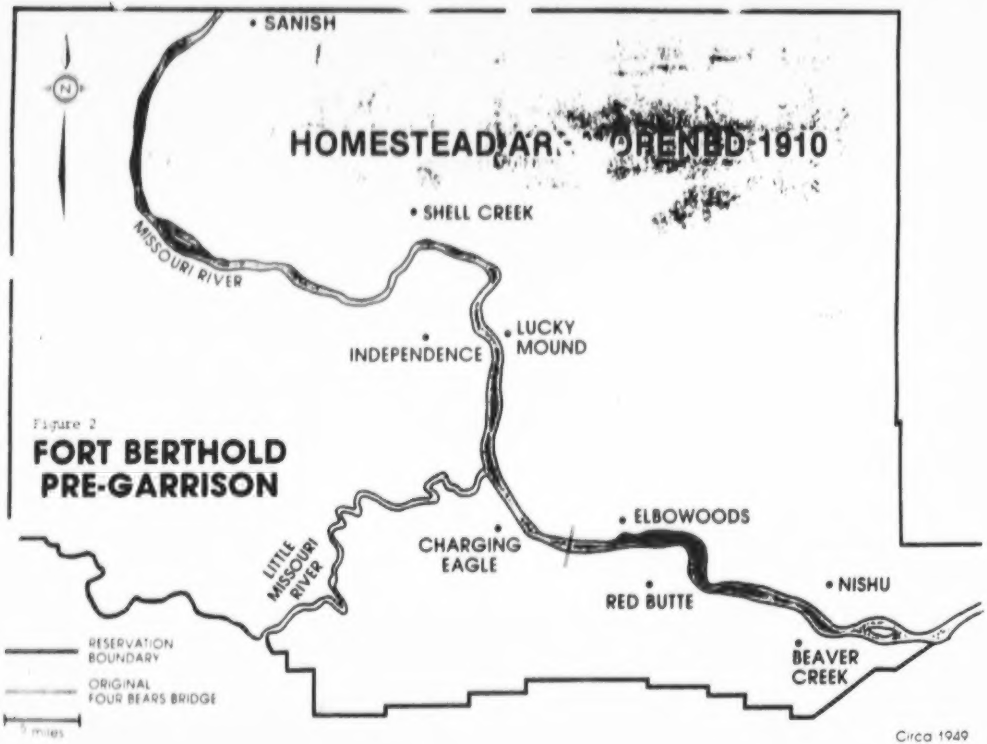

SANISH
HOMESTEAD AREA OPENED 1910
SHELL CREEK
MISSOURI RIVER
LUCKY MOUND
INDEPENDENCE
ELBOWOODS
CHARGING EAGLE
LITTLE MISSOURI RIVER
NISHU
RED BUTTE
BEAVER CREEK
N
RESERVATION BOUNDARY
ORIGINAL FOUR BEARS BRIDGE
? miles
Circa 1949

Figure 2

FORT BERTHOLD PRE-GARRISON

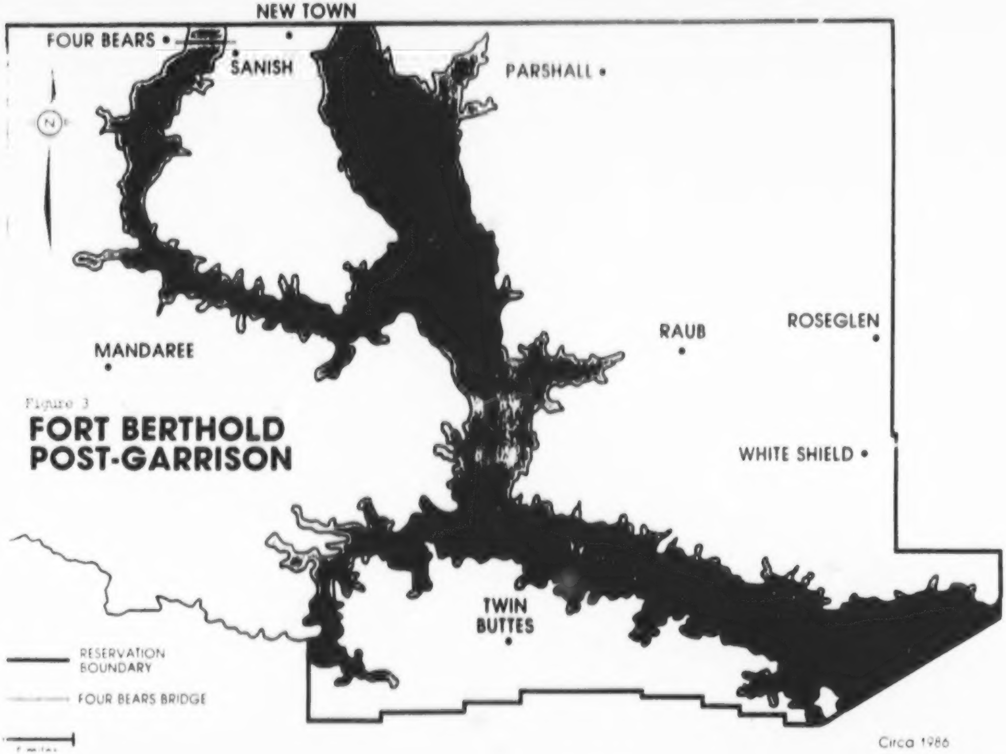

NEW TOWN
FOUR BEARS
SANISH
PARSHALL
N
RAUB
ROSEGLEN
MANDAREE
WHITE SHIELD
TWIN BUTTES
RESERVATION BOUNDARY
FOUR BEARS BRIDGE

Figure 3

FORT BERTHOLD POST-GARRISON

Circa 1986

Prepared by the House Select Committee on Hunger

TRENDS IN FEDERAL OUTLAYS FOR INDIANS
SELECTED FEDERAL PROGRAMS
FISCAL YEARS 1981-1986
NOMINAL DOLLARS VS CONSTANT DOLLARS*
(In Thousands)

	1981	1982	1983	1984	1985	1986	1986 % Of Base Year Outlays**
Bureau of Indian Affairs:							
Economic Development							
Nominal	75,915	77,985	65,087	62,243	64,524	60,423	79.59%
Constant		72,612	58,217	53,565	53,681	48,846	64.34%
Education							
Nominal	261,600	259,371	266,000	257,760	296,948	246,535	94.24%
Constant		241,500	237,925	221,824	247,044	199,301	76.19%
United States Department of Labor:							
Native American Employment and Training Program							
Nominal	124,262	77,985	65,087	62,243	64,524	60,423	48.63%
Constant		72,612	58,217	53,565	53,681	48,846	39.31%
Summer Youth Employment and Training Program							
Nominal	36,555	12,749	13,208	13,177	13,176	12,435	34.02%
Constant		11,871	11,814	11,340	10,962	10,053	27.50%

* Nominal dollars are defined as actual dollar outlays and constant dollars are actual outlays adjusted for inflation using the GNP Implicit Price Deflator.

** Base Year is 1981 when data are available, otherwise 1982 is substituted.

Prepared by the House Select Committee on Hunger

TRENDS IN FEDERAL OUTLAYS FOR INDIANS
SELECTED FEDERAL PROGRAMS
FISCAL YEARS 1981-1986
NOMINAL DOLLARS VS CONSTANT DOLLARS*

(In Thousands)

	1981	1982	1983	1984	1985	1986	1986 % of Base Year Outlays**
United States Department of Agriculture:							
Food Distribution Program on Indian Reservations							
Nominal	34,311	40,000	47,257	48,950	41,148	57,257	166.87%
Constant		37,244	42,269	42,126	34,233	46,287	134.90%
Elderly Feeding Program on Indian Reservations							
Nominal	NA	600	513	566	614	643	107.17%
Constant			492	523	548	558	93.00%
Special Supplemental Food Program (WIC)							
Nominal	NA	16,700	18,115	20,509	21,403	24,301	145.51%
Constant			17,380	18,942	19,108	21,078	126.22%
School Lunch							
Nominal	NA	13,100	8,287	9,282	9,915	10,356	79.05%
Constant			7,951	8,573	8,852	8,983	68.57%

---

* Nominal dollars are defined as actual dollar outlays and constant dollar outlays are actual outlays adjusted for inflation using the GNP Implicit Price Deflator.

** Base Year is 1981 when data are available, otherwise 1982 is substituted.

Prepared by the House Select Committee on Hunger

TRENDS IN FEDERAL OUTLAYS FOR INDIANS
SELECTED FEDERAL PROGRAMS
FISCAL YEARS 1981-1986
NOMINAL DOLLARS VS CONSTANT DOLLARS*
(In Thousands)

	1981	1982	1983	1984	1985	1986	1986 % Of Base Year Outlays**
United States Department of Health and Human Services:							
Head Start							
Nominal	NA	28,457	31,400	30,621	35,827	36,184	127.15%
Constant			30,126	28,282	31,986	31,352	110.17%
Administration for Native Americans							
Nominal	NA	26,300	30,900	25,398	26,535	26,492	100.73%
Constant			29,646	23,462	23,690	22,979	87.37%
Title VI Grants to Elderly Native Americans							
Nominal	6,000	5,735	5,800	5,738	5,935	7,100	118.33%
Constant		5,340	5,188	4,938	4,938	5,740	95.67%
Indian Health Service							
Nominal	679,481	653,928	691,900	789,905	872,080	870,881	128.17%
Constant		608,871	618,873	679,781	725,524	704,027	103.61%

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* Nominal dollars are defined as actual dollar outlays and constant dollars are actual outlays adjusted for inflation using the GNP Implicit Price Deflator.

** Base Year is 1981 when data are available, otherwise 1982 is substituted.

PREPARED STATEMENT OF ROLLIE MORUD, SUPERINTENDENT, NEW TOWN PUBLIC SCHOOL DISTRICT, NEW TOWN, ND

Mr. Chairman and Members of the Select Committee on Hunger. Welcome to New Town! It is an honor and a pleasure to have you here.

I appreciate this opportunity to make comment about the specific mission of your visit to Fort Berthold and a couple comments about the broader mission of the House of Representatives Select Committee on Hunger.

As you review the testimony and data regarding diabetes and the high incidence on the Fort Berthold Indian Reservation you will arrive at a course of action. My senses tell me that part of your course of action will include research and education. I personally want to help. I also want to offer the assistance of the New Town Public School District. Education is our business and we want to do the job well.

Regarding the broader mission of the Select Committee on Hunger, I encourage your support of the child nutrition programs and more specifically the National School Lunch Program. For many children in the United States and New Town in particular, the daily lunch received in the public schools is the only nutritionally balanced meal they eat. We are finding out daily that many of the health problems experienced are preventable or at least delayable with proper nutrition. Wellness or self care needs to have a strong foundation in the schools of our nation. Successful individuals possess a sound mind, body and spirit.

I request the help of the committee with a facility problem. The New Town High School kitchen and lunchroom were built in the early 1950's. The facility was effective then but is not today. Attached is correspondence from a North Dakota State Lunch official and the Northwest area sanitarian substantiating the inadequacies of the facilities. The sanitarian indicated in conversation that this was the worst score he has ever given a school. The facility is poor and needs addressing.

Although my primary concern is with the total school program offered to the young people of New Town Public School District, I do see the greater community needs and services of a first class kitchen. I can forsee the use of such a facility as the base to provide "meals on wheels" to the handicapped and elderly of the community. Nutrition in my mind is not only a service that the school could provide but also through such a service the school would benefit from tremendous public relations.

The New Town School District has requested federal assistance through the PL815 since 1974. That application remains extremely low on the DOE priority rating for several reasons. Our racially mixed student population hurts us in the formula. The fact that it is not a classroom construction proposal also hurts. Obviously, the lunch program is an integral component of today's school system. If after 12 years, the application has not been funded, it will never be funded without specific congressional action.

Due to the heavy federal impact, the school district's ability to raise funds for construction is limited. The building fund raises $20,000 each year. This is not enough to keep up with the roofing problems as they develop. Attached is a recent estimate which places the cost of the project at $432,106.

I am not familar with all the federal sources available to address our type of problem. I hope that appropriate federal funds can be directed to this concern which has fallen between the cracks. We have waited a long time in New Town and are appreciative of anything that you can do.

Once again, welcome to New Town. I hope your visit is productive. Thank you for your consideration.

THE STATE OF NORTH DAKOTA
Department of Public Instruction
Dr. Wayne G. Sanstead, Superintendent
(701) 224-2260
NORTH DAKOTA CENTENNIAL

October 7, 1986

Rollie Morud, Superintendent
New Town Public School
Box 700
New Town, ND 58763

Dear Mr. Morud:

SUBJECT: FOOD SERVICE FACILITY AT NEW TOWN HIGH SCHOOL

This letter is written as a result of my recent visit to the New Town Public School. The purpose of the visit was to make an assessment of the adequacy of the existing food service facility and to observe meal preparation and service at the high school. I have the following comments.

- In general, the food service area does not allow adequate space for receiving, food preparation, dry and refrigerated/frozen storage, and dishwashing. The approximate measure of the area in which these activities take place is 475 square feet. The United States Department of Agriculture (USDA) recommends the following space be available for meal preparation and service for 200 students. Please note that the use of 200 students as a base figure does not include a potential increase in participation.

Recieving	50	Square Feet
Dry Storage	100	"
Refrigerated/frozen Storage	120	"
Food Preparation	500	"
Serving	200	"
Dishwashing	150	"
Office Space	60	"
Maintenance & Refuse	50	"
TOTAL	1,230	Square Feet

- In addition, the USDA recommends 2,200 square feet of cafeteria space for 200 secondary students. The current space is 936 square feet. We realize that space requirements, however, are dependent upon the number of meal services and the seating arrangement.

  - The kitchen area does not allow for efficient food preparation.

- It is evident that space constraints make menu planning very difficult. In addition, we question the safety of food service employees working in a restricted area. The school has attempted to upgrade kitchen equipment, but these efforts are futile within inadequate facilities.

- There is inadequate space for the thawing of meats. This is of particular concern since improper thawing practices easily lead to food contamination.

- The approximately 80 square feet available for dishwashing is insufficient. The tilting braising pan is only inches from the dishwashing area. This is unacceptable. In addition, storage space for cleaned dishes and utensils is nonexistent.

- The dry storage area is too small and the door accessing area is too narrow. Storage areas should be equipped with doorways that are 36" - 40" wide to allow carts to pass through.

- The milk cooler/milk service area is located in the corner of the cafeteria since space is unavailable in the serving line. It is recommended that the entire menu be served in one area to make meal pattern monitoring by the present staff possible.

In general, a kitchen facility built in the 1950's for a smaller school enrollment cannot fill the needs of today's food service. Unfortunately, the current facility is nothing more than a wide hallway, making efficient and safe food handling and production impossible.

It appears that the school district is attempting to provide high quality meals utilizing menu choices for secondary students. These fine efforts are hampered by insufficient space and equipment. We recommend that consideration be given to expanding and upgrading the food service area in this school.

Please advise our office if we can be of assistance in the future.

Sincerely,

Kathy Grafsgaard

Kathy Grafsgaard, Acting Director
School Food Programs

KG:lft

UPPER MISSOURI
DISTRICT HEALTH UNIT
BOX 756
PHONE 572-3763
WILLISTON, NORTH DAKOTA 58802-0756

M. JEROME OLSON, M.D.
DISTRICT HEALTH OFFICER

October 8, 1986

Mr. Rollie Morud
Superintendent of Schools
New Town, North Dakota 58763

Dear Mr. Morud:

On October 7, 1986, a sanitation inspection was made at New Town High School's kitchen facility by myself. At that time, there were numerous items in need of correction. Those items are as follows:

1) The kitchen is in need of more facilities that can properly maintain product temperature. This includes both hot and cold storage such as steam trays, a walk-in cooler, freezer, etc. The proper storage of food assures that there will be minimal contamination of the food from any source and having enough facilities to maintain the proper temperature is the best available means to control the growth of pathogens.

2) The kitchen is in need of more storage area that can be centrally located and adjacent to the kitchen area. Easy access to this area is also very important. As of this date, there is not enough adequate storage area that can assure minimal exposure to potential sources of contamination.

3) New counter tops are needed throughout the entire kitchen area. The present counter tops are cracked and have rough edges, making it difficult for cleaning, thus increasing the opportunity for bacterial growth.

4) The dishwashing machine is in excellent condition for it's age, but there are two very important items that need to be corrected. The sanitation rinse did not reach the required temperature and the exposure time was too short. To ensure that proper sanitizing of the utensils is achieved, these two items must be corrected.

5) More area and storage equipment are needed for the proper storage of utensils and other cooking equipment. Improper storage of the utensils and equipment can increase the chances of exposure to contamination.

6) The garbage containers need to be covered and more are needed. Any such containers must be covered while in the food preparation area.

7) Insects (flies) were found throughout the kitchen area. This is partially due to the inadequate ventilation system in the kitchen area. Insects are capable of transmitting disease by contamination of food and food contact surfaces. Therefore, it is especially important to eliminate the means of entrance into the kitchen area. By providing adequate ventilation for the kitchen area, all entry ways could be closed, thus minimizing exposure of insects (flies) to the food and food preparation areas.

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9) The ventilation system for the kitchen area is definitely inadequate. During the time of food preparation, the heat and humidity increase to a practically intolerable level. Sufficient ventilation would reduce condensation and the temperature in the kitchen area, thus inhibiting mold and bacterial growth, in addition to making it a more suitable working environment for the kitchen employees.

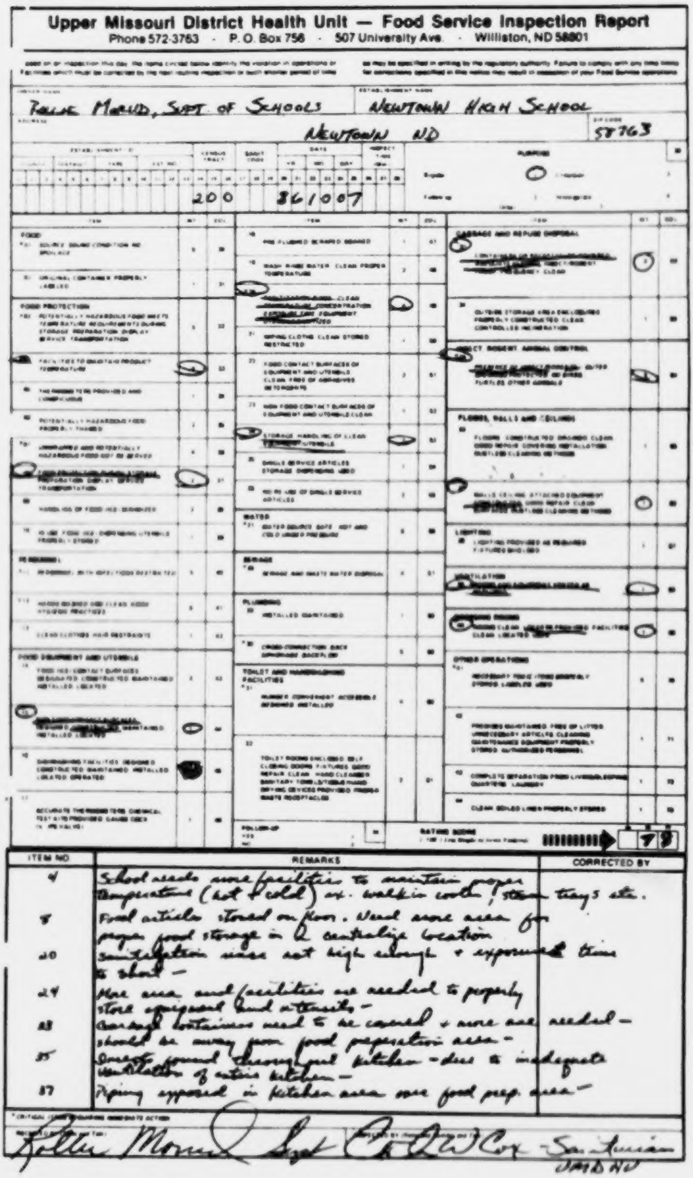
10) No lockers are provided for the kitchen employees. Lockers or other suitable storage must be provided for the proper storage of personal belongings.

The size of the kitchen and the facilities used in the kitchen does not make it possible to adequately serve the number of students and school personnel using the service. The employees are doing a fine job but their efforts are being hampered by the inadequate size of the kitchen and the equipment made available. The most important points to consider when making these corrections is to increase the size of the kitchen area, provide more facilities to maintain product temperature and to provide adequate ventilation.

If you have any questions concerning the inspection report or this letter, please feel free to contact me at this office.

Sincerely,

Arthur W. Cox
Sanitarian



Upper Missouri District Health Unit — Food Service Inspection Report

Phone 572-3763 · P. O. Box 756 · 507 University Ave. · Williston, ND 58801

Rollie Morud, Supt. of Schools

Newtown High School

Newtown ND

58763

200

861007

Rating score: 79

ITEM NO.	REMARKS	CORRECTED BY
4	School needs more facilities to maintain proper temperatures (hot + cold) ex. walk-in cooler, steam trays etc.	
8	Food articles stored on floor. Need more area for proper food storage in a centralized location	
20	Sanitization rinse not high enough + exposure time to short –	
24	More area and facilities are needed to properly store equipment and utensils –	
33	Garbage containers need to be covered + more are needed – should be away from food preparation area –	
35	Insects found throughout kitchen – due to inadequate ventilation of entire kitchen –	
37	Piping exposed in kitchen area over food prep. area –	

Rollie Morud Supt

Cox – Sanitarian UMDHU

HUNTER • GROBE
ARCHITECTS/PLANNERS
PARKSIDE BUILDING
325 SEVENTH STREET SOUTH
FARGO, NORTH DAKOTA 58103

701-293-7678

September 22, 1986

Mr. Rollie Morud, Supt.
New Town Public School District
P.O. Box 700
New Town, ND 58763

RE: High School Addition
Scheme "E" - Phase I

Dear Mr. Morud:

Preliminary estimates for this project are as follows:

NEW CONSTRUCTION	
6010 s.f. new construction $53 per s.f.	$318,530.00
REMODELING	
432 s.f. remodeling $43 per s.f.	$ 18,576.00
KITCHEN EQUIPMENT	$ 50,000.00
FEES, CONTINGENCY, MISCELLANEOUS, ETC.	$ 45,000.00
	$432,106.00

Sincerely,
HUNTER-GROBE ARCHITECTS/PLANNERS

Vern Hunter
VH/bl

Prepared Statement of Peter H. Bennett, Chief, Phoenix Epidemiology and Clinical Research Branch, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Public Health Service, U.S. Department of Health and Human Services

Mr. Chairman and Members of the Committee:

I am Dr. Peter H. Bennett, Chief of the Phoenix Epidemiology and Clinical Research Branch of the National Institute of Diabetes and Digestive and Kidney Diseases. I am very pleased to have the opportunity to provide you with a statement for the record about our research efforts to investigate the occurrence and causes of diabetes mellitus and its complications in Native Americans.

The National Institute of Diabetes and Digestive and Kidney Diseases initiated an investigation of diabetes mellitus among American Indians in 1965. The first investigation, conducted among the Pima Indian population of the Gila River Indian Reservation in Arizona, showed that diabetes among the Pima occurred in 50 per cent of those aged 35 years and over, a rate 10-15 times as frequent as reported at that time in the general United States population, and that, among those with diabetes, the characteristic vascular complications of the disease, such as diabetic retinopathy and diabetic nephropathy (kidney disease due to diabetes) occurred with frequencies similar to those reported in diabetics of different ethnic groups elsewhere.

This extraordinary finding, that Pimas have a high rate of diabetes, led to an immediate decision by the Institute to establish a longitudinal study of this population in order to: (1) determine the reasons for the unusually high frequency; (2) define the determinants, or causes, of the diabetes in the population; (3) investigate the development, or natural history of the disease; and (4) determine the causes and natural history of the specific complications.

An in-depth knowledge of the determinants and pathogenesis of the disease and its complications are prerequisites to the design and institution of scientifically based methods of treatment and prevention. The continuing study of diabetes, particularly among the Gila River Indian Community, contributes in a major way to the mission of the Phoenix Epidemiology and Clinical Research Branch of the Institute. That mission is to conduct direct and collaborative field studies to investigate the epidemiologic, genetic, and environmental determinants of diabetes in selected American Indian populations; to conduct clinical and laboratory research in the disease processes of diabetes and other diseases, with particular emphasis on those more prevalent among the American Indian population, and to expedite the application of research results in the Indian Health Service programs through improved understanding of the causes, treatment, and prevention of these diseases.

The interest of the Institute and an expanding commitment to this program through the years have resulted in the most extensive and largest prospective study of diabetes mellitus that has been performed anywhere in the world.

I would now like to describe some of our findings and discuss the current and anticipated future directions of this research effort.

Occurrence of Diabetes in American Indians

Diabetes among American Indians is almost exclusively of the non-insulin dependent type. This type of diabetes accounts for 80-90 percent of all diabetes in the United States and an even higher percentage worldwide. It usually attacks those aged 40 years and over in contrast to insulin dependent diabetes, which more often affects Caucasian children and adolescents. Nevertheless, both types are associated with a similar spectrum of complications, although the underlying pathogenesis is quite different.

Among American Indians, diabetes was reported to be rare before 1940, and indeed, up until the early sixties, Alaskan Eskimos and Aleuts appeared to have less non-insulin dependent diabetes than other Americans. However, the disease appears to have become much more frequent in recent years among all American Indian tribes. In the Pima Indians, for example, there was a 40 percent increase in the age-adjusted prevalence of the disease between 1967 and 1977, and the incidence (that is, the rate of development of new cases) increased to a similar degree during periods centered around 1970 and 1980. Among the Alaskan Eskimos and Aleuts, the disease is no longer believed to be rare.

Among American Indians, the prevalence of diabetes varies appreciably from tribe to tribe. Our studies among American Indians aged 35 years and over in the southwest United States have indicated that the Papago have a prevalence (42 per cent), approaching that of the Pima (50 per cent), whereas some other tribes, such as the San Carlos Apache Indians and the Cocopah, have somewhat lower frequencies (25 and 35 percent, respectively), but still have rates much higher than currently found in the Caucasian population of similar age range (c. 7.0 per cent). A comparison of the rates of development of new cases of the disease in the Pima Indians with those of the predominantly Caucasian population of Rochester, Minnesota, indicated that diabetes develops twenty times as frequently among the Pima.

Complications of Diabetes in the American Indian

Most of the morbidity and mortality associated with non-insulin dependent diabetes arise from the vascular complications associated with the disease. These complications include diabetic retinopathy, which frequently leads to blindness; diabetic nephropathy, one of the more serious and previously fatal conditions, which leads to end-stage renal disease; and an increased frequency of atherosclerosis, which leads to an excessive frequency of coronary heart disease and lower-limb vascular disease. The latter is associated with very much higher rates of gangrene and amputation that result in serious incapacity and disability.

Our efforts have included investigating the reasons for the development of these vascular complications in non-insulin dependent diabetes. For example, we know that the duration of the disease plays an important role in the development of nephropathy, retinopathy, and atherosclerotic disease. Also, the degree of hyperglycemia and blood pressure level are related to the rate of development of each of these complications. While hypertension was once believed to be a complication of the diabetes, our data and those of other investigators now indicate that in fact hypertension causes several types of vascular disease in the diabetic.

Diabetic nephropathy is one complication that is relatively more significant among American Indian diabetics than others, probably because of the earlier average age at which the diabetes usually develops and the consequent likelihood of longer durations of diabetes. The incidence of diabetic nephropathy according to the duration of diabetes, however, is similar to rates reported for other ethnic groups. A recent follow-up study has shown nephropathy was the underlying cause of death in 40 percent of the Pima Indians with diabetes followed over an eight-year period. Our longitudinal study also has shown that in those with diabetes of more than 20 years duration, over 30 percent have developed renal insufficiency. This condition, which was formerly uniformly fatal, necessitates treatment by renal dialysis or renal transplantation for the continuation of life, imposing large demands on health services and a tremendous burden on the unfortunate patients who must endure such treatments.

Among the Pima Indian population, dialysis, at the present time, is about 15 times as frequent as in the general U.S. population, in spite of the Pima population being appreciably younger. With the increasing frequency of diabetes during the past 20 years, we anticipate that the numbers of Pima Indians requiring such treatment will inevitably increase considerably in the forthcoming years, unless some radical new approach to the management of diabetic renal disease can be found. Because of the significance of this complication to the American Indian community, and the potential for research advances in renal disease caused by diabetes, our Institute is currently embarking on an expanded effort to investigate the determinants of diabetic nephropathy in the Pima Indian population and to conduct controlled clinical trials of interventions that instead may potentially delay or stop the progression of this complication.

Diabetes and Pregnancy

The outcome of pregnancy is also influenced by non-insulin dependent diabetes. Our studies among the Pima Indians have shown that the offspring of diabetic pregnancies suffer excessively high rates of morbidity in the newborn period and experience long-term sequelae such as extreme obesity and much higher rates of diabetes as adolescents and young adults. While perinatal mortality remains higher in the offspring resulting from the diabetic pregnancy, the rate has fallen considerably in recent years, presumably as a result of improved medical care and management. The offspring, however, continue to be large for gestational age at birth. They also have a four- to fivefold increased rate of congenital anomalies, or birth defects, which arise as a result of the abnormal metabolism in the intrauterine environment during the first trimester of pregnancy. By the age of 15-19 years, about 40 percent already have diabetes themselves, as compared to about 3 percent of similar aged offspring whose mothers were not diabetic at the time of pregnancy. Whether or not these long-term complications of the diabetic pregnancy that were first recognized and documented among the Pima Indian population can be prevented by better control and management of diabetes during pregnancy remains to be determined.

Causes and Pathogenesis of Diabetes in the American Indian

The most important research goal of our Institute in the ongoing investigations of diabetes among the Pima Indians is to identify the determinants and pathogenesis of the diabetes itself. Such knowledge is necessary if there is to be any likelihood of preventing the disease.

Genetic factors are important and are probably a prerequisite in determining the susceptibility of the individual to developing non-insulin dependent diabetes. Environmental factors also play a critical role in determining whether or not the disease develops in susceptible individuals. The increasing frequency of the disease over a ten- or twenty-year period and the effects of diabetic pregnancy on diabetes in the offspring can only be attributed to the effect of precipitating factors in the environment.

The precise nature and role of environmental factors as precipitants of the disease, however, are only partially defined at this time. Obesity is an important factor that interacts with the genetic susceptibility to determine whether or not diabetes develops and the age at which it does so. The causation of obesity, however, is as elusive in the American Indian as it is in other ethnic groups and the general population. An excessive intake of calories relative to caloric expenditure is a prerequisite for the development of obesity. It is unknown whether or not this excess arises as a result of an increase in caloric intake or a decrease in caloric expenditure, resulting from reduced physical activity or possibly from a metabolic abnormality that leads to lower-than-usual caloric requirements for daily living. The Institute's Clinical Research Section in the Phoenix Indian Medical Center is undertaking a series of studies designed specifically to address these questions.

The epidemiologic and clinical research studies among the Pima are yielding a more in-depth knowledge of the pathogenesis of non-insulin dependent diabetes in the general population than ever before. Subjects with impaired glucose tolerance (but with glucose tolerance levels that are less than those diagnostic of diabetes) have a high risk of developing diabetes, although not all of them do so. This is true in the Pima Indians as in other populations.

Our earlier investigations showed that the non-diabetic Pima, in general, had higher insulin levels than Caucasians of similar age and obesity. Thus, we formulated the hypothesis that inadequate insulin action, or insulin resistance, was probably the underlying defect related to the likelihood of the American Indians to develop diabetes.

Further research, using new techniques to measure insulin resistance and to define the reasons for it, has now shown that insulin resistance is uniformly present in Pima Indians with non-insulin dependent diabetes, and that insulin resistance increases proportionally with the degree of glucose intolerance in non-diabetic subjects. Thus, those with impaired glucose tolerance have appreciably greater insulin resistance, on average, than those with normal glucose tolerance. Furthermore, our investigators have shown that insulin resistance is the result of inability of the body, and of muscle in particular, to store glucose in a normal manner. This abnormality appears to be due to a derangement in the intracellular pathway for the processing of glucose and the formation of glycogen. While insulin resistance is known to be affected by obesity and physical activity, our investigators now have demonstrated that this derangement shows familial aggregation. The identification of this defect may, therefore, be the essential clue in defining the genetic factors which underlie the susceptibility to non-insulin dependent diabetes.

individuals with impaired glucose tolerance and insulin levels that are above normal, but are lower than average for those with impaired glucose tolerance, are the subjects who are most likely to develop diabetes. These findings, therefore, suggest that if specific ways can be found to increase the intracellular glucose storage pathway and/or insulin secretion in those with impaired glucose tolerance, then the progression to diabetes may be preventable. Identification of the precise genetic mechanisms relating to insulin resistance could also lead to identification of those genetically susceptible at a time when their glucose tolerance is still entirely normal. If this were possible, then preventive measures could be instituted early in life and targeted specifically at individuals who would otherwise develop the disease.

Prospects for Prevention and Control

Impaired glucose tolerance indicates a high risk of diabetes, and such affected persons constitute a group in whom several possible intervention strategies to prevent or postpone the development of non-insulin dependent diabetes--possibly dietary measures and exercise--could be assessed. The effectiveness of such measures, however, has not yet been adequately demonstrated. Such preventive approaches--and eventually perhaps intervention at an earlier stage if genetically susceptible individuals can be identified--offer the best hope that the incidence of non-insulin dependent diabetes in the American Indians, and in other populations, can be reduced. In the meantime, efforts to minimize the effects of hyperglycemia in those with diabetes and efforts to provide effective treatment for diabetic nephropathy, diabetic retinopathy and other complications, as well as careful management and control of the diabetic pregnancy to minimize the effects on infant morbidity, are well established and provide the mainstay of conventional care for the disease.

I appreciate the opportunity to provide this statement for the record concerning diabetes and its impact on the American Indian, and to inform you about our ongoing research activities in this area. I shall be pleased to answer any questions that you may have.